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Notes of the Month

IMPORTANT ROLE OF RESEARCH

Good research required not only good scientists and good equipment, but also the right atmosphere, said Mr. L. A. Wiseman (Director of Research) at the recent annual meeting of the British Rayon Research Association. In the laboratories it was customary for every piece of work to be critically reviewed continuously and when the time came for publication, not only was the work reviewed internally and externally by appropriate experts where necessary, but was also considered by the appropriate sub-committee and again experts were consulted. To facilitate internal criticism the Association ran a number of internal symposia both on scientific and technological work and on these occasions knowledgeable people were invited to attend so that the staff could benefit from any criticism they might make while the work was in progress.

In spinning, three things had been well received by members during the past year. First, the work on the effect of ring travellers on yarn hairiness and it was noted that several firms had made independent investigations of this matter as the result of this stimulus from the Association. Secondly, a number of different types of slub catcher had been installed and some information on their performance and maintenance had been given to members. Thirdly, the work on control of vibration on slubbing frames had been completed and a private publication was at present in the press. Before issuing a statement the method of controlling vibration on a full-scale slubbing frame had been tested and yarn had been produced from these slubbings, so that the criteria of efficiency had been based upon quality of yarn. A number of instruments for measuring properties of filament yarns have been marketed through Louis Newmark Ltd. As these have gone out to some members the Association had been made to realise that the performance requirements were sometimes higher than anticipated. The main difference between anticipations and what had happened in practice was that members wished to run the instruments for prolonged periods. This had brought up certain minor difficulties in design, but these had been rectified and the additional information passed on to the manufacturers of the instruments. An interesting new instrument was the one designed for measuring the number of broken filaments in glass yarns and where there was any periodic variation along the length of yarn in this number.

In weaving, probably the most important short-term work for members during the year had been that on weft bars in c.f. nylon fabrics. During the year surveys on automatic looms had been finished and one report had been issued, two were in the press and the fourth ready to go to press as soon as approved by the mills concerned.

In finishing, practically the whole of the effort available in this section had been concentrated on a study of ways of achieving minimum care finishes for continuous filament fabrics. The most difficult case had been deliberately chosen—e.g. filament warp and filament weft, because any success in this would certainly be very valuable when directed to easier cloths such as one of filament warp and spun weft or any cloth with an overall pattern either embossed or printed. The Association could not claim to have achieved success, but at least it was known what the problem was in scientific terms. At the end of last year it was agreed by members that the oil spotting agent BRRASK A.Y. should be marketed by normal commercial methods. This had a steady sale of about 250 galls./month and it would appear that the preparation had proved to be relatively trouble-free in use since the number of queries from members have been very few. Following from this work a number of pad scours had been developed for overall cleaning of cloth and these scours could be used on certain cloths for de-sizing as well as cleaning. This work was receiving a lot of attention in collaboration with member firms and recently the sales of P.S.4 have increased substantially.

During the last 18 months precise values had been obtained for the heat transfer properties of fluid beds and a lot of work had been done to reduce the tension required to pull broad fabrics through the bed. It was not thought that the process offered any advantages for drying broad fabrics but there was some possibility that it might offer advantages for dyeing hydrophobic fabrics. The Association had not worked on what were, in principle, simpler problems, viz. the application of fluid beds to narrow fabrics and cords. Some members had worked on these problems and the technique might have commercial application for heat-setting nylon tyre cords.

PROGRESS IN MAN-MADE FIBRES

At the recent annual meeting of the British Man-Made Fibres Federation, Sir William Palmer (chairman) refuted recent suggestions that following the introduction of the Government's redundancy plans for cotton, there was less need for a separate organisation for the man-made fibres industry. "It is" he said, "important to recall that there is ample evidence to support the need for the man-made fibres industry to continue to retain its independence in dealing with numerous matters, vital to its welfare and where there are special man-made fibre interests to be safeguarded or promoted." Co-operation with other fibres was often desirable and could readily be obtained when there was a common policy to be followed, but in numerous important instances there were special and separate circum-

stances applying to the man-made fibres and these would continue to require independent consideration and action.

Sir William was optimistic about the effects of the redundancy and re-equipment schemes in Lancashire, the largest outlet for man-made fibres, and while remarking that there was no doubt that the pressure to buy Lancashire man-made fibre fabrics in recent weeks could be attributed to anxiety about cloth deliveries on the part of the distributive trades and the effect of the schemes on price levels, ample spinning and weaving capacity was left, especially with the arrangements being made for extra shift working. The car boom had ensured that industrial yarn makers had been busy (note: tyrecord is the largest single outlet for man-made fibres). The newer outlets, such as the tufted and conventional carpet industries had continued to provide expanding demand for man-made fibres.

O.E.E.C. ANALYSES DEVELOPMENTS IN THE EUROPEAN TEXTILE INDUSTRY

THE recovery noted in most European countries in the textile industry during the spring is expected to continue to the end of the year and during the first half of 1960. This is the main conclusion of the short analysis prepared by the O.E.E.C. Textiles Committee at its last meeting for inclusion in its annual report, now published by the organisation under the title "The Textile Industry in Europe: Statistical Study—1958—Trend in 1959."

The main conclusions of this report may be summarised as follows: 1958 was not a good year for the textile industry. Production in the textile industry proper and in the artificial fibre industry fell sharply—in both cases the first fall in production which had taken place since the recession of 1952. Among the main branches of the industry only the synthetic fibre industry succeeded in increasing production in 1958.

There were several reasons for the 1958 fall in production —a check to the rise in consumer expenditure in clothing, probably some check to industrial demand for textiles, a sharp fall in exports to non-member countries—but by far the most important single cause seems to have been a sustained running-down of stocks throughout the trade during 1958. By the beginning of 1959 stocks in the pipeline had fallen to a very low level and it was mainly an increase in orders to reconstitute stocks which led to a marked improvement in production in most member countries during the second quarter of 1959.

Prospects for the various branches of the industry differ. The synthetic fibre industry is expected to continue its expansion and prospects for the wool industry, in particular the worsted sector, are good. Some improvement is also expected in the cotton, artificial fibre and flax industries. On the other hand, the situation of the jute industry has given rise to some pessimism.

By means of tables and graphs, this report presents information allowing comparisons to be made between 1958 and the preceding years. It deals both with trends in member countries' textile industry taken as a whole and trends in the main branches (cotton, wool, artificial fibre and jute). In addition, a special annex is devoted this year to production and trade in synthetic fibres in Europe.

HOW TO RAISE EXPORTS £100 MILLION A YEAR

LORD BOYD-ORR, President of the British Council for the Promotion of International Trade, in a statement to the Council's annual general meeting said that Britain could add at least another £100 million a year to our exports to China, the Soviet Union and the East European countries, most of it in technical and engineering goods. "This," said Lord Boyd-Orr, "is a modest target. It would only be a start." Quoting the benefits of East - West trade in the past to certain British industries, Lord Boyd-Orr mentioned that in recent weeks a trade delegation from Moscow with a buying programme of over £60 million worth of engineering goods had been negotiating with British firms for food machinery, chemical plant, paper and pulp-making machinery and so forth. These were only instances of the type of business which could be done on a vastly greater scale given the correct approach to trade with the planned-economy countries. They gave the lie to those who, on one pretence or another sought to minimise the possibilities of East - West trade or to prove that these Eastern bloc countries offered only insignificant markets for British exporters. If we look back over the last ten years, we could see that trade with the planned-economy countries despite all the embargoes, import restrictions and other hindrances, had not only made an appreciable contribution to Britain's total foreign trade but had been of vital importance to certain industries which were particularly in need of increased exports. For example, since 1949 no less than £22,108,350 worth of textile machinery had been delivered to the planned-economy countries, an average export of over £2 million a year. In the first ten months of 1959 nearly £4 million worth of textile machinery was shipped to China, Poland and the Soviet Union. Since 1949 Bradford had supplied to these countries nearly £44 million worth of wool tops, representing 11·66% of our total exports to any market. This was, of course, in addition to the heavy buying of wool in Australia, South Africa and New Zealand. Despite the restrictions imposed by the embargo in the earlier years, our exports of iron and steel and non-ferrous metals to the planned-economy countries in the last ten years had amounted to more than £97 million.

The industrial output of the planned-economy countries continued to increase at a great pace, he said. The target of Soviet industrial production in 1965 was 80% higher than in 1958. That of the German Democratic Republic was nearly 90% higher. Hungary's five-year plan provided for a 65% increase in production from 1960 to 1965. By 1960 Czechoslovakia's industrial output would have risen 59% above 1956. The momentum generated in China by by the "Great Leap Forward" of 1958 was continuing, with industrial output increasing in 1959 by over 25%. A similar pace of development was now seen in Bulgaria, which was taking a "great leap" to fulfil the five-year plan in three to four years. As their industrial output increased, the foreign trade turnover of these countries would continue to rise. These were, therefore, dynamic markets, particularly for the types of technical goods in which Britain excelled.

"The time has come," Lord Boyd-Orr said, "to stop shilly-shallying with East - West trade and to give it the attention and support it deserves." He called for longer-term credit facilities and the granting of a Government or private loan to finance trade with the Eastern-bloc countries.

Referring to export outlets for the industrialised countries of the world, Lord Boyd-Orr stated: "If, as we all now expect, tensions between East and West will ease and a serious attempt be made to deal with disarmament, the stage will be set for an all-out attack on the problem of the under-developed countries. The needs are enough to occupy both East and West for many years to come. Here lies the way to healthy economic expansion, taking up any slack capacity arising from advancing production techniques and from the scaling down of arms production.

Softeners and Oils in Sizing and Slashing

Softeners and oils are essential for satisfactory warps. The proportions and conditions of such additions vary widely and results are governed largely by the care exercised in making such additions. The following notes point out some of the problems which may arise, together with suggestions for their correction

By "TECHNICAL CORRESPONDENT"

IN a discussion on warp sizing La Piana[1] draws attention to the practice of adding softeners to starchy sizes and makes the point that there is little difference between the elastic properties of films produced from various types of starch sizes. On the other hand, if the starch has been modified in any way by oxidation, hydrolysis or enzymatic treatment, weaker films are obtained. The writer then goes on to point out the disadvantage of adding softeners so far as the strength of films is concerned and states that the addition of glycerine, castor oil and tallow will not only soften the starch film, but will weaken them, if more than 5% on the weight of the binder is added to the mixing. It is also noted that small quantities of soap (mention of which has been made elsewhere in the present notes) will also bring about considerable weakening of the size film and to that extent also of the sized yarn.

On the other hand, this weakness may be corrected to some extent by a small addition of dextrin. While it is known that dextrins by themselves are not of great value in sizing, due to the much greater percentage required to give equal strength of film as compared with starch, it is nevertheless useful as an addition on account of its strong adhesive power, in order to counteract the weakening effect of having to add what might in some cases be considered as excessive amounts of softeners in the form of fats or oils.

Warp Softeners

The idea of softening the warp before slashing has been tried in several mills according to reports from U.S. practice.[2] In one case very good results were obtained from various points of view, such as:—

(1) Less waste yarn at the front of the slasher, because of fewer breaks at the cone.
(2) The yarn also was more parallel on the loom beam.

Shedding at the loom was increased slightly, but was of a different nature. Warp breaks were 3% lower per loom hour and weft breaks were also fewer. A study of costs revealed that a 2% increase in weaving would be required to cover the cost of application of the softener.

Reports from other sources indicated the use of a wax compound spray on the yarn before slashing but results were disappointing. Two mills told of reduced weft breakage as a result of the lubrication of the shuttle by the softened warp yarn. An interesting application is that reported from a mill which added 1% of fat to the yarn in front of the slasher by a revolving applicator. One hundred and fifty looms of 12·25s warp had less shedding and fewer warp and weft breaks, slashing being carried out at 95 yds./min. with the applicator running at 23 r.p.m. It has already been noted that a reduced fat content size may bring about more shedding at the loom, due to insufficient binding power as the result of poor penetration. On the other hand, it has been found that in some cases the starch of a fat-reduced size can also be lowered without varying the weaving qualities of the yarn.

Thin Boiling Starches used with Fats

The use of thin boiling starches (starches converted to more soluble types by acid hydrolysis) is necessary when sizing heavy yarns for penetration and binding power. Such sizes set on cooling to a hard, stiff gel which forms a harsh, rough film on the yarn surface, leading to such faults as adherence and rolling in the yarn sheet with consequent trouble on the slasher cylinder and on the loom beam. For this reason a high percentage of fat may be required to give the size mixings the qualities necessary in the sized yarn. On the other hand, a high percentage of fat reduces adhesiveness and gives weaker films which, in turn, give rise to other faults which have already been noted elsewhere.

Rolled or crossed ends on a loom beam can give a lot of trouble in weaving and may be caused, in many cases, by very heavy sizing with insufficient softener added to the mixing. It has already been noted that one of the advantages of adding softener to a size mixing is to make the yarns more pliable and therefore lie more parallel to one another on the loom beam, thus reducing the risk of rolled ends, and this point should be given special attention when sizing heavy warps which require a large amount of size to bind the fibres together.

On the other hand, it should be pointed out that an excess of softener, such as saponifiable tallow, on a heavy yarn can bring about an increased amount of shedding of surface fibre at the loom. The reason for this is that the adhesiveness of the starch film is reduced in proportion to the amount of softener added and with a heavy or loosely spun yarn the amount of surface fibre will be correspondingly greater with the results as aforesaid.

Elasticity and Breaking Strength

It is pointed out by Hart[3] that starch films reduce the elasticity of sized yarn and that it is important to carry out sizing with as little reduction as

possible in the elasticity, because much better results are obtained on the loom thereby. Good sizing should not reduce the elasticity of the yarn by more than 20% to 25%. Cotton yarns between 20s and 30s have 4·5% elasticity; 60s to 80s—3·5% to 3·8%; over 120s from 2% to 3%.

Two lots of sized yarns gave increases in breaking strength of 31% and 34% respectively more than unsized yarn. The 31% increase was obtained on 22s yarn sized with 280 lbs. thin boiling starch and 14 lbs. of softener, bulked to 365 gallons. The 34% increase was on 30s yarn using 300 lbs. of the same starch and 20 lbs. of softener to 365 galls.

The foregoing facts and tests emphasise the importance of adding softener to the size mixing to increase elasticity and breaking strength.

Sticking on Slasher Cylinders

One of the main troubles in sizing is sticking on the drying cylinder of the slasher. Too much size is one reason for this but another is, not enough softening in size mixture. For various reasons already given it is important to have the right amount of softener in the mixing and it is well known that sticking on the cylinders will give rise to increased shedding at the loom, as well as increasing the risk of yarn breakage. Hart suggests not less than 8 lbs. of tallow per 100 lbs. of starch and, in addition, to take care that the slasher cylinder is thoroughly cleaned with soap and water. A further suggestion from the same source is to add one pint of turpentine or Kerosine to the size mixture after cooking—this will prevent sticking.

Types of Softener

Recommendations as to the proper type of softener to use in warp sizing are made by Strong[4] and it is emphasised that proprietary compounds are not always the best solution to this problem. Only known and tried ingredients of a high standard of purity should be used; tallow, castor oil, spermacetti wax and glycerine may be used with safety. Japan wax—a natural wax obtained from sumach with a high palmitic content and a melting point of 122°F. may also be used with good results. In some cases cocoanut oil and soap can be added for special purposes, but the general conclusion is that tallow with a high melting point, 118 to 120°F., is the best all-round softener, as this grade is likely to be free from adulteration.

A small percentage of soap is said to give very good results because of its powers of emulsification and dispersion. Good clean colour in any fat which is added is of the first importance, as this indicates not only purity but ensures freedom from yellowing later on, due to rancidity and oxidation of the fatty matter.

It is emphasised that paraffin wax should be left severely alone, as there is no known method of removing this by any after-treatment and, if the goods are subsequently intended for dyeing or printing, the retained wax will act as a resist to the colouring matter and give rise to endless trouble.

China Clay. This is added in cheap goods as a filler or weighting agent, but will also act as a softener when used in the size mixing.

Properties of Softeners

One of the most valuable properties of any type of fat in starchy size is that of slowing down of the rate of gelatinisation of the starch in the hot mixing. The result of this is that the hot size will have a low viscosity and remain fluid as the warp yarn sheet passes through the squeeze roll, thus giving better penetration and maintaining the size in this condition until evaporation of the water takes place on the slasher cylinder.

In general, softeners reduce abrasion resistance and brittleness of the sized warp. The viscosity of the size mixing is reduced with improved penetration and less sticking of the warp yarns to one another in the sheet and on the drying cylinder.

For rayon sizing Hart[5] recommends a blend of saponifiable and unsaponifiable oils of medium titre. The saponifiable fats give good handle of the yarn and the unsaponifiable oils supply lubrication and prevent adhesion in the warp sheet.

Sulphonated Oils. These usually contain about 15% of water and are used in the proportion of 30% gelatine and up to 9% with starch sizes.

Sulphonated Tallow. The moisture content of commercial grades is about 50% and, in general, from 5% to 10% on the weight of the binder is used in the size mixing.

Addition of Softeners

Two methods of adding softeners are mentioned by Hart[3]: (*a*) addition with starch before cooking, and (*b*) addition after cooking. In general it has been found that all the ingredients can be added, except raw tallow, which is preferably mixed in after cooking. The reason for this is that if tallow and similar fats are not emulsified beforehand, they interfere with the bursting and gelatinisation of the starch granules, with resultant formation of lumpy size. Addition of fat should be made either 10 to 15 mins. before the end of the cooking period or after the starch has reached boiling point, the fats will not then interfere with the pasting qualities of the starch and will melt freely and become thoroughly incorporated in the size mixing.

Sizing Spun Rayon

In a discussion on sizing spun rayon Hart[5] emphasises the following points:—

(1) The use of softeners facilitates easier separation of the warp at the front of the slasher, with reduced roughening of the warp ends and exposure of fibre ends. On the other hand, softeners lower the abrasion resistance and, at the same time, increase pliability, with resultant improvement in weavability.

(2) Shedding at the loom is reduced by the use of waxes of high melting point. This fact, taken in conjunction with other notes in the present series, would indicate that good penetration of the spun rayon yarn is assisted by this type of wax which is not only more easily miscible but will give increased penetration of the body of the yarn by the hot size mixture.

Wheat Starch and White Softening for Spun Rayon Size

For sizing spun rayon the following method has been recommended, using wheat starch. The softener is stearine saponified by borax, and the amount of softening should not exceed ½ lb. to every 10 lbs. of starch. In general a size containing 10% of wheat starch will be sufficient for most purposes. Tallow should only be used in such mixings if a saponifying agent is used in the recipe and sago flour should also be avoided on account of the alleged difficulty of subsequent removal, although this point has been disputed by other investigators.

Penetration of spun rayon yarn is of vital importance. The principal fault is matting of the yarns so that they stick together in the yarn sheet. Good penetration of the yarn by size and a proper proportion of softener are both necessary if the yarns are to be kept apart in the warp sheet. Excessive size will cause matting and softeners are necessary in order to overcome

this difficulty. With softeners it is also unnecessary to use split rods in the slasher. Recommended softeners are of the sulphonated oil and tallow types which easily emulsify in the mixing when added in accordance with precautions which have been outlined elsewhere in the present notes.

Locust Bean Sizes. These have been recommended as a substitute for softeners to counteract the harshness and brittleness of a pure starch size. The main points are: (*a*) the increased thickening power of the vegetable mucilage as compared with starch and (*b*) the lower solids content.

Gelatine and Oil Sizes for Rayon

It has already been noted that gelatine forms a very tough film on the yarn with high abrasion resistance. For this reason it is necessary to use a plasticiser in order to make the film flexible, particularly if the yarn has subsequently to be twisted.

A long period of investigation as to the best type of oil to be used for the purpose has led ultimately to the general conclusion that the best types are the stable, soluble oils, such as sulphonated olive, castor and most mineral oils, the most widely used being sulphonated olive oil and sulphonated mineral oils. It is known that these types of oil reinforce the strength of the yarn and their power of penetration has the combined effect of easy removability and good lubrication of the yarns during sizing and weaving.

On the other hand, it should be noted that gelatine requires careful handling from several points of view, the first being excessive agitation by stirring or pumping prior to application; which will weaken the gelatine film by reducing its powers of adhesion. Again excessive heating above 140°F. will bring about the same result.

Another point worth noting is that if gelatine films mixed with certain types of oils which are easily oxidised, are excessively heated on the drying cylinder of the slasher, an oxidised film will be formed, which is insoluble in hot water and can only be removed by the application of proteolytic enzyme solutions which have the property of solubilising gelatine and other protein sizes, such as casein. Gelatine is very adhesive and forms, when plasticised with oils, a continuous thin, tough, and resilient film on the yarn. It has high abrasion resistance and has approximately twice the hardness of any other type of size even with the addition of 30% sulphonated oil. It has also good powers of penetration which are assisted by the presence of oil.

Castor Oil with Gelatine in Rayon Sizing

The following useful information is given by Griffiths[6]: this writer states that the most popular plasticiser for gelatine in sizing viscose and acetate rayon is still castor oil. Early methods used raw castor oil, but it is now realised that thorough mixing with the gelatine size can only be obtained by using castor oil emulsions.

A typical method of production is given thus: "2 lbs. raw castor oil are stirred into 10 lbs. Turkey Red oil (50% soda finish neutral sulphated castor oil) until the mixture is homogeneous whereupon a further 2 lbs. of castor oil is stirred in. This process is continued until a total of 60 lbs. raw castor oil has been added. Towards the end the castor oil additions may be stepped up from 2 lbs. to 5 lbs. The resultant rather stiff jelly may then be diluted to any required strength by stirring water into it." It is then stated that such emulsions are never indefinitely stable and ultimately separate out, thus producing the same difficulties as were encountered in using raw castor oil.

The most successful modern method is to use special types of sulphated castor oil containing a considerable amount of raw castor oil. Ordinary Turkey Red oil or normal sulphated castor oil contains not more than 4% of raw unsulphated oil. The new type of Monopole oils may contain up to 20% of unsulphated oil with increased powers of softening and the latest types of oil may contain up to 70% of raw castor oils which are still capable of giving either opalescent solutions of very fine emulsions in water. Different types of oil available are set out in Table 1.

Table 1. Types of Sulphated Castor Oils

Ingredients	I %	II %	III %	IV %
Total castor oil	47·25	38·14	77·98	79·00
Free unsulphated castor oil	3·80	17·50	62·00	70·95
Combined SO_3	2·46	2·48	1·38	0·69
Alkalinity as NaOH, due to Soap	3·84	1·13	0·73	0·37
Free fatty acids	2·61	1·63	2·38	1·69
Sodium sulphate	1·81	2·18	0·90	0·45
Water	44·90	55·23	18·18	19·00

British Gum and Oil Size for Rayon

The writer quoted above[5] states that good results in weaving are obtained with British gum in rayon sizing when used along with 3% sulphonated tallow or 9% sulphonated oil (based on the binder). On the other hand, it is stated that British gum alone gives a large amount of shedding at the loom. This note is interesting in relation to the opinion of Fischer who found that in the recipes for sizing rayon of 100 different firms only 2% included pure dextrin and soft oil, 2% glue-dextrin-paraffin, 2% glue-dextrin, 1% potato flour-dextrin-paraffin and 1% glue-dextrin-Ramasit size. It is probable in the latter case that insufficient softeners of the right type had been used to overcome the inherent defect of British gum or dextrin which used alone has too much binding power.

Draining Sized Rayon Yarn

Attention is drawn by Wilson[7] to the problem of draining stacks of rayon crepe yarns which have been sized by the soaking method and which generally contain a proportion of high melting point fats or waxes in the size mixing. It is noted that some opinions favour the draining method as a part of the soaking process, which is thus allowed to come to completion. On the other hand, it is pointed out that there is no control of temperature during this period, therefore the high melting point fats and waxes will cool off on the outsides of the stacks of yarn and, to this degree, penetration of the size and softener will be hindered at those portions of the yarn with consequent unevenness of sizing. While it is agreed that hydro-extraction following the stacking or draining period will level out matters to some extent, experience has shown that this is not the case. It is also agreed that some period of drainage is necessary, but it is emphasised that with hot size containing fats and waxes every effort should be made to get the yarn to the hydro-extraction stage and to the dryer as soon as possible and, preferably, while still hot.

Influence of Oil on Stretch

The following interesting information is given in the "Rayon Warp Sizing Specialist,"[8] quoted in "Textile Manufacturer":—

"Realisation of the risks of excessive stretch can be obtained when one examines synthetic yarn under a microscope. Magnification clearly shows small open spaces around the filaments, which are filled with the lubricant put into the yarn by the yarn manufacturer, as a sort of cushion or protective coating for the filaments that prevents their rubbing against each other. This oil prevents adhesion of the filaments and preserves the flexibility of the yarn. When the yarn is stretched excessively, however, the

natural position of the strands is altered and resulting friction is a source of broken ends in weaving.

"On the question of stretch another correspondent makes the point that the mill man who stretches the yarn too much forgets that you can never stretch a warp evenly. If a man sets a machine for 10% stretch, the warp is not stretched 10% at every point over the whole length. It may possibly be stretched 3% to 4% at one point and 12% to 14% at another. He never stretched a yarn more than 2% if possible, as he found that this gave the best results in every way."

Linseed Oil Size for High Quality Goods

In a discussion of this problem by Nobsi[9] in "Kunstseide Und Zellwolle," 1950, No. 11, p. 461, some points of interest are made regarding the use of linseed oil for special purposes where quality is a prime consideration and where crepe weft is used. It is noted, in the first instance, that for high class fabrics the difficulties in weaving sometimes make it necessary to weave "back," thus exerting considerable strain on the warp. If the latter is sized with soluble sizes of the ordinary type the film on the yarn is weak and excessive stretch will take place at the portions affected, with production of dense bars of weft at the parts undergoing extra strain. If, on the other hand, the warp is sized with linseed oil the film is much more elastic and does not rupture, so that no trouble is experienced. It is further pointed out that with crepe fabrics a more uniform pebble effect on the crepe rayon is obtained during the creping of the fabrics on linseed oil treated yarns because of the slow and gradual removal of the size as compared with other more soluble types. Closely woven acetate rayon taffetas are also said to give better looking fabrics with linseed oil sizes. The same remarks also apply to other closely woven fabrics, such as umbrella cloths, etc.

It is, of course, realised that linseed oil sizes are readily oxidised and rendered insoluble on exposure to air and light, with consequent difficulties in removal of size. It is first of all necessary to choose a first quality linseed oil, and it is noted that protective agents may be added to the size to prevent rapid or premature oxidation. Sized stock should be stored in a cool, dry place for not more than two months before use.

Linseed oil sizes may be applied from either organic solutions or aqueous emulsions. The organic solvents may be of the petroleum type, such as benzine, while application from aqueous emulsions have the drawback that the swelling of the rayon by water increases the penetration of the size and subsequent de-sizing becomes more difficult. It is clear from the foregoing that if the decision is taken to use linseed oil sizes for reasons of quality production in a weaving shed, careful study should be made of all the factors governing oxidation of the size film and subsequent de-sizing of the material before final processing and finishing.

Rice Starch and Oil for Waterproof Sizing

An interesting application of starch and linseed oil is noted by Williams[10] who gives some particulars for the production of a non-porous waterproof dressing. The sizing mixture is produced by emulsifying a mixture of one part of rice starch and one part of linseed oil in warm water made slightly alkaline with ammonia. Rice starch is chosen because of its fine granular structure. The starch is used merely as a thickener or carrier for the linseed oil varnish, in order to give thorough penetration of the fibres. When the mixture has been thoroughly dried on the fabric and the oil brought into an insoluble condition by oxidation, the fabric is immersed in a weak solution of malt extract which solubilises the starch enabling it to be easily removed in washing, the final result being to leave the insoluble linseed oil varnish intact upon the fabric in the form of a thin film.

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(10) Williams: Starch Products and the Textile Industry. Tex. Col. (undated).

Dust Collecting Servicing Scheme

DALLOW Lambert and Co. Ltd., Thurmaston, Leicester, have introduced a unit dust collector servicing scheme, believed to be the first of its kind in the country. The scheme is for the purpose of keeping the company's unit dust collectors in good condition and functioning efficiently. A fully trained service engineer makes regular visits at six-monthly intervals—or other dates mutually agreed—and services each dust collector, replacing any parts necessary to put the equipment in first-class working condition. The charges for this are said to be extremely reasonable as an encouragement to users of the equipment to avail themselves of the benefits which can be derived, giving a longer working life to the units, obvious advantages to the operators and machines, and compliance with Factories Act requirements regarding regular inspection of such collectors. Each firm participating in the scheme is provided with a maintenance service register which can be shown to H.M. Inspector of Factories during his periodic visits.

Dallow Lambert unit dust collector servicing scheme

Planning and Weaving Terry Bedspreads

A terry loom equipped with a double-lift, double-cylinder jacquard for pile and a special creel to hold pile yarn packages might solve the problem of one-face figured terry fabric

By T. HARGREAVES

THE present extremely difficult trading conditions, fierce competition, badly depleted order books and other uncertain factors have compelled some terry cloth manufacturers to look for and examine new fields and outlets for these specialised productions. Whilst the terry towel will, undoubtedly remain their chief business interest, some manufacturers firmly believe that this type of fabric has many more potential uses in industry and the home. In this connection it is interesting to note that no little attention is being devoted to the production of terry bedspreads.

The average 4 ft. 6 ins. double-bed, fitted with the modern deep, innersprung mattress requires a bedspread approximately 84 ins. wide to provide full overhang at the sides. Similarly, it would have to be about 96 ins. long to give full coverage and adequate end overhang. Terry bedspreads must be washable and this point must be watched by the manufacturer or merchant when calculating the most effective dimensions. The width after laundering will be at least 6 ins. less than the loom-state width. A bedspread 97×84 ins. loom-state will probably shrink to 90×78 ins. after washing but this would still provide full coverage and overhang at sides and foot.

The manufacturer must also decide at the beginning whether the bedspread is to be washed finish—in which case, and subsequent shrinkage will be negligible—or to sell it loom-state with full dimensions to compensate for the inevitable shrinkage during washing. In all probability, the bedspread will be woven with either an overall floral or a geometric design, entailing the use of a full width jacquard harness to control every end on the pile beam. The ground warp could, of course, be controlled by the usual healds operated either by bottom tappets or a dobby. A dobby is not absolutely necessary for controlling the ground weave in this class of fabric but, if the manufacturer has to weave two, three or four towels in the width when not manufacturing bedspreads, it is advisable to have the loom equipped with a dobby as well as a jacquard.

To weave a terry bedspread 84 ins. wide, loom state, a yarn spread in the reed of 88 to 90 ins. is required. For the best weaving conditions a 96 ins. reedspace loom is therefore needed. Another point to be decided is whether the job will be woven in single-shuttle or drop-box looms. Full harness jacquard patterns seldom need the use of other than terry weaves to form heading patterns and for terry bedspreads a single-shuttle loom should be all that is required. If, as already mentioned, the loom may also have to weave two, three or four towels in the width—with fancy headings—it will be better to equip it with a 2-box motion at one side.

Type of Jacquard

The next logical step is to decide the size and type of jacquard to employ for this work, and the number of hooks and needles is determined principally by the designer of the pattern to be woven. Not long ago, the writer was called in for consultation in connection with just such a problem by a firm of loom makers, the mounters retained to build the harness, and the firm wanting to manufacture the bedspreads who, incidentally, had decided to equip the looms with two 624 hook, double-lift, double-cylinder jacquards mounted to run in tandem fashion. On examining pattern it was found that one 400-hook machine was ample for the work involved.

A consideration complicating the problem was the fact that the manufacturer concerned wanted the loom to be able to weave bedspreads in other types of weaves, in addition to terry weaves. Allowing for this, he would have been better advised to employ one 624-hook jacquard, specially arranged to weave terry wherein each card serves for three picks or one terry loop. The jacquard—complete with all harness and comberboard—could be readily dismounted and stored when changing to other than terry weaves. For other weaves, a second double-lift, double-cylinder machine could be kept in reserve with all harness and comberboard, to be quickly mounted when required.

The problem of re-tying the full harness—in the case of tandem jacquards, when changing from terry to non-terry—would be extremely costly and time consuming. It must be remembered that in terry weaving only half the total number of ends—the pile—is in the jacquard harness, but all ends would have to be in the jacquard when weaving other types of cloths. A special type of jacquard is, however, available for weaving 3-pick terry fabrics; in this, one pattern card serves for 3 picks—or one terry loop cycle. The machine is made in different sizes—104 to 624 hooks—and a 400s machine would probably be ample for weaving terry bedspreads.

Flexibility in Design

It is advisable for the designer to concentrate on establishing a series of designs that would be interchangeable without having to cut and re-tie the harness whenever the pattern had to be changed. Designing a series of patterns helps considerably in indicating the best method of entering the harness in the comberboard. Working on these lines ensures that pattern changing is a relatively simple and cheap operation. The next point, also a designing problem, involves the designer, the manufacturer and the buyer. The questions to be answered are:—

(1) Should the design be a repeating type which repeats from selvedge to selvedge and lengthwise as well ?

(2) Should there be an overall design for the 54 ins. centre of the bedspread, and two reversible panels of 15 ins. at each side, e.g., 15+54+15 ins. = 84 ins. full width ?

(3) In addition to side panels, does the bedspread have to have matching panels at head and foot ?

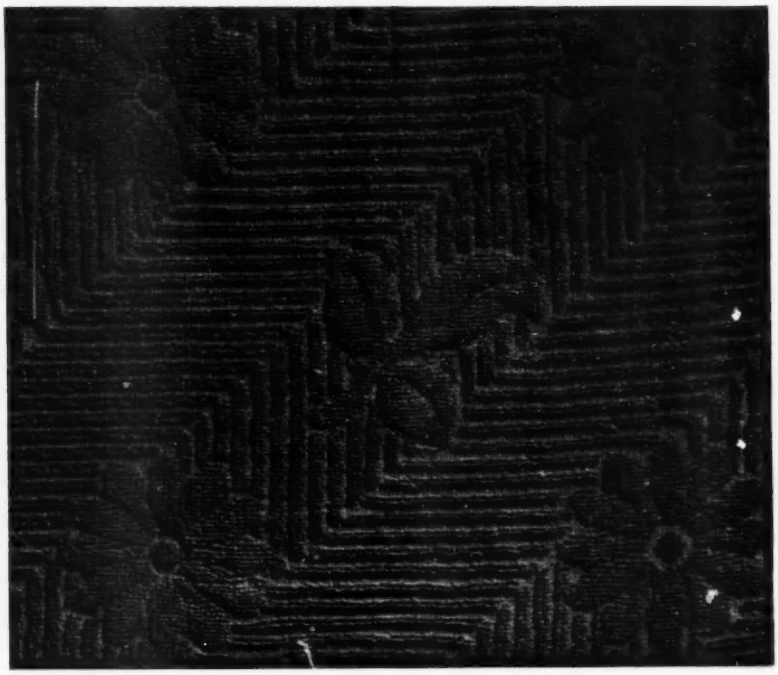
Method (1) is the cheapest and simplest way of designing and weaving the bedspread. Employing a 400-hook machine—each hook controlling two pile ends—means that 800 pile ends can be in one repeat of the pattern widthways which, with a reed of 24 dents/in. = 800 ÷ 24 or up to 33 ins. wide for each repeat of the pattern or any part thereof. With method (2) only about half the 400 hooks will be available for the body pattern. The other 200 hooks will be needed for the side panels and it may mean using a 624-hook machine instead of a 400-hook model.

In method (3), in addition to subdividing the hooks for body and size panels, the number of cards to be cut will be equal to the full length of the spread 96×48 p.p.i. ÷ 3 picks per card = 1,536 cards in set in contrast to the few hundred for one repeat of the pattern as in (1) or (2). Where cost has to be kept within moderate limits Method (1) is obviously simple and cheap. Method (2) adds slightly to the cost through the addition of side panels, and more so if the work entails a larger type of jacquard. With Method (3), apart from the increased cost for cutting so many cards, there is another serious disadvantage; any small defect immediately makes a "second" of the whole 96 ins. length of the spread because it cannot be cut out. On the other hand, with Methods (1) and (2) any defect can be cut out at the spot and the 96 ins. measured again from this cut. Another point in connection with Method (3) is that if a double-lift, double-cylinder jacquard was used instead of a special terry jacquard, the number of cards in the set would be 4,608 instead of 1,536 —a very cumbersome and costly arrangement.

Manufacturing Problems

Selection of design and jacquard are only two of many problems in this type of weaving. The buyer, usually a non-technical individual, is not in the least concerned with the manufacturer's technical worries; all he is bothered about is price and appearance. The buyer might have seen tufted bedspreads with the design on the face side only and, in some cases, may want the terry loops to be woven in floral, etc., pattern on one face of the terry cloth with the underside free from terry loops. If the standard type of terry loom is employed, it is technically impossible to weave figured terry without weaving those loops not desired in the face pattern, on the underside of the spread. The terry bedspread would be appreciably reduced in both weight and price if this could be done.

A terry loom equipped with a double-lift, double-cylinder jacquard for the pile and a special type of creel to hold packages for the pile yarns—instead of a warp—might be the answer to this problem of one face figured terry fabric. Each pile yarn would have to be so tensioned that it would allow the loop to be fully formed at beat-up of the three picks, but sufficiently tensioned to prevent the loop forming when not required. In this manner, those loops not required would weave as ground weave into the body of the cloth and not as loops on the underside. The designer in this arrangement would have to lift—lower—lift the pile end for a loop on the face. Then lower—lower—lift in the next 3-picks for the pile end to weave as ground with only one crossing intersection with the weft against two crossing intersections with the weft when forming loops.



A diagonally woven flower and trellis design composed of yarn-dyed two-fold warp and pile with single weft

Almost all things are possible in this class of work but many may take considerable time and money before complete satisfaction is finally achieved. Terry bedspreads are being woven, however, on wide, standard type terry looms. The designs are such as call for blocks of terry weaving on the face side to form the pattern, and weaving the blocks of terry on the underside when not required to form the pattern. In manufacturing these, all yarns are pre-dyed in self colours and the ground is 2/20s, the pile 2/20s, drawn 26 dents per in. in the reed with 44 p.p.i. of 14s single weft. Ratio of loop to ground 4 to 4½ : 1. The photograph shows one type of design now being manufactured. It is a simple flower and trellis design woven diagonally.

Change of Address

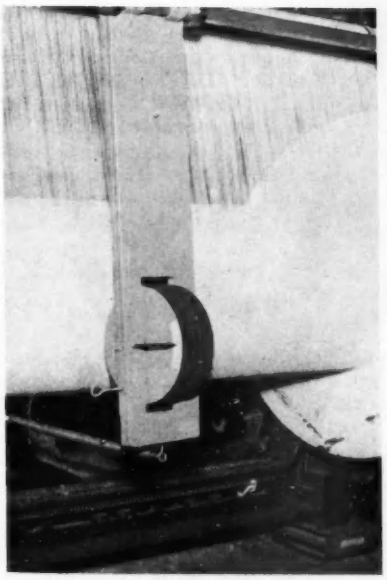
To provide improved and enlarged office accommodation from which to service clients in Birmingham and the surrounding area, the Keith Blackman office has been moved to 1651 Pershore Road, Birmingham 30 (Tel.: Kings Norton 4151/2).

Measuring Crimp in Cotton Yarns

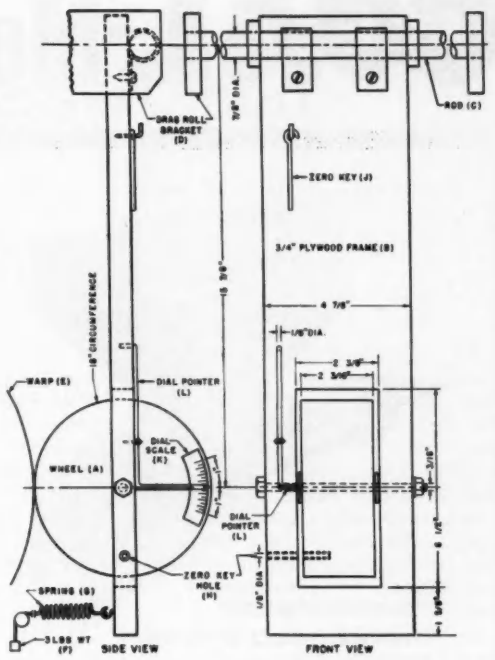
By M. LORANT

A NEW and accurate device for determining how much cotton yarn contracts (crimps) when woven into cloth will interest yarn and fabrics research workers. Yarn crimp, which greatly influences strength, flexibility, abrasion and tear resistance of cotton fabrics, is also important to researchers in developing new fabrics and to manufacturers in weaving new patterns. Actual crimping is caused mainly by interlacing of threads in a cloth. And the difference in yarn length before and after being woven is the measure of crimp. Up till now, there has been no really satisfactory way to determine this important index to cotton quality.

The new measuring device—developed by cotton technologists, E. C. Kingsbery and N. P. Roddy of Southern Utilisation Research and Development Division, New Orleans, Louisiana—consists mainly of shellacked hardwood wheel 18-in. circum., mounted on a plywood frame (shellac gives traction when the wheel turns with the warp). The wheel is held firmly against the warp by a 3-lb. weight suspended beneath the loom and fastened to the frame by a rope-and-spring connection to prevent bouncing due to the loom's rocking motion. A small piece of yarn of a different colour from that in the loom is inserted in the fabric being woven. The measuring wheel is set at zero, weaving is started and continued until the wheel comes back to zero—a distance of 18 ins. Another piece of coloured yarn is inserted and normal weaving is continued. When the cloth is removed from the loom, the distance between the two coloured yarns is measured. From these measurements—knowing the original yarn length to be 18 ins.—the per cent. of crimp is easily calculated.



One revolution of the wheel marks off 18 ins. Beginning and end are marked with coloured yarn. Difference in original and woven yarn length indicates the crimp measure



Front and side elevation of the new measuring device

According to the researchers, there isn't any single ideal crimp value. For best performance, different fabric constructions require different crimp values. Oxford and duck cloths, for instance, are woven from highly crimped yarn. Voiles and organdies, on the other hand, are woven from low-crimped yarn. The effects of yarn crimp on cotton quality can be explained in part by crimp's behaviour in the fabric.

A tightly woven or highly crimped fabric, for example, means that the yarns have less mobility and thus tend to be stiff and inflexible. A high crimp in both the warp and wool yarns means that both the yarns are equally exposed on the fabric surface and will have a high resistance to abrasion.

Fabric strength is affected by crimp, too, but by distribution rather than by per cent. of crimp. Stressing a fabric straightens the horizontal threads and causes the crimp to transfer to the cross yarns. If these latter yarns jam at the yarn intersections before this can happen, fabric strength is greatly reduced.

Tear resistance is also determined largely—but in a little more complicated way—by yarn crimp. Basically, fabrics with a large number of threads per given area have a high crimp and low resistance to tear. Fortunately, once the new device has been used to forecast how much a yarn will crimp, simple adjustments can then be made on the loom roller to correct for any deviation from the desired amount of crimping.

In using the new device as an aid in determining crimp, the following procedure should be adopted:—

(1) Insert one pick of weft differently coloured from that in fabric being woven.
(2) Set measuring wheel at zero.
(3) Start loom and weave until measuring wheel is back at zero.
(4) Insert one pick of weft as in Step 1.
(5) Start the loom and continue normal weaving.

When the cloth is removed from the loom the distance between the two coloured picks of filling can be measured; from these measurements the percentage crimp can be readily calculated.

Seamless Hose Machines

Well-known as the manufacturers of full-fashioned hosiery machines, Schubert and Salzer, Ingolstadt, Western Germany, are now building under licence, a modern two-feed seamless hose machine. This machine, the Moretta Type D.R.2, is available, in the first place, with 400 needles and 3¾-in. dia. Important features of the machine include (*a*) spliced parts are made by both feeders, (*b*) instep can be made fully in micro-mesh and the spliced sole in plain stitch, and (*c*) air-operated take-down. Further details can be obtained from Muschamp Knitting Machinery Ltd., 81 Lower Parliament Street, Nottingham, sole representatives in the British Isles and Eire.

COAL-Mechanical Stokers

and the

CLEAN AIR ACT

As recently announced in the press, a new ministerial order permits the installation of mechanical coal burning equipment in Smoke Control Areas. It follows that the most modern and efficient plant should, of course, be installed on the lines of the latest Hodgkinson boiler house equipment.

"METERFEED" UNDERFEED STOKER

This stoker has separate drive and fan motors which our "Custodian" Panel controls by cutting in the fan at a predetermined period before the drive and cutting out the fan after the drive has stopped.
The "Meterfeed" Underfeed Stoker is designed for the utmost fuel economy **without smoke** and is available in a full range of sizes in both hopper and bunker feed models and suitable for boiler, kiln and furnace application. All models embody the controlled feed principle.

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The combination of the "Custodian" panel with the "Meterfeed" Underfeed Stoker operates as a highly efficient guarantee against the production of smoke and its consequences under the Clean Air Act.

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Research Progress Report

Members of Shirley Institute have probably never before seen so many new developments displayed as on the "open days" this year. Full facilities provided visitors with an excellent opportunity to get a comprehensive picture of the extent and variety of the research programme.

"THE real value of research results can only be appreciated when they are applied in the mills," said Dr. D. W. Hill, director, British Cotton Industry Research Association, at the recent annual meeting, "and, contrary to popular belief, research results are not avidly sought and taken up, either in this or probably any other industry. There is an innate conservatism in all of us against which the new idea, the new machine, the new process must be sold. In consequence, the value of the Institute to the trade is related not only to the calibre of the research work but also to the extent to which it is absorbed into the practice of the trade." The application of research results through direct services had been increasing steadily in recent years, he went on, and last year the liaison staff paid 1,263 routine visits to members and 3,100 special visits at members' requests. The most significant thing was that request visits outnumbered routine visits by nearly 2,000, thus continuing the trend of recent years. In 1955, request visits outnumbered the routine visits by about 1,000. In the last year alone, request visits by members increased by 11%. During the same period technical enquiries to the Institute involving laboratory work increased by 14%.

Opening, Cleaning and Spinning

Of particular importance in the present circumstances of the trade was that part of consultative work concerned with the installation of new machinery. It was part of the Institute's task to keep abreast of new developments and experienced members of the staff were sent abroad at intervals to appraise new technical developments. In addition to these visits a number of specific machines had been examined and compared and reports issued for the benefit of members. Among these was a comparison of the Hartford and Whitin J.5 combers at high production rates; an investigation of the Whitin Even-Draft drawframe; a survey of Scharer and Schweiter automatic pirn-winders; an examination of a new two-delivery, high-speed drawframe developed by Alsacienne and known as the E.R.50; trials of different kinds of flat wire, of the Crosrol web purifier at the card, and of the Cardpen, a drafting device put in place of the calender rollers on a card; and a study of the economics of the "Unifil" winder.

For some time now work had been in progress at the Institute on a new approach to the problem of producing scutcher laps of uniform weight. Equipment had been developed and had performed well in recent mill trials. For example, in experiments to investigate the effect of openness of feed, the conventional system permitted a variation of about 10% in the laps while with the new system in operation there was no significant difference in the weights of laps from the different feeds. The outcome of this and other work on opening and cleaning processes was likely to be a greatly improved scutcher. At the a.g.m. last year the prototype was shown of a cop-sorting device for condenser bobbins intended to minimise the incidence of weft bars in cloths woven from these yarns. As a result of that demonstration several spinners expressed their interest and arrangements had now been made for the installation of equipment for trials in two mills. Other work of interest to spinners included laboratory and mill investigations of drawframe drafting systems, in particular, their sensitivity to setting conditions; the best conditions of operation of different drafting systems on both speedframes and spinning frames, study of friction and its effects in ring spinning; power consumption in spinning; and much work on periodic faults in yarns.

Doubling, Winding, etc. Processes

As a result of a considerable amount of work carried out in recent years, a relatively inexpensive device for the prevention of four-folds on doubling frames now seemed to be a practical possibility. The device had been undergoing a large scale mill trial and had established its efficiency. A redesign of the device was now being considered to make it rather more robust. Other work for doublers had included investigations into the causes of hairiness in doubled yarns, a comparison of wet doubling and doubling without water in atmospheres of different humidities and on the

Using the electrical analogue—a method for investigating irregularities in package dyeing—Mr. R. B. Lowe is seen plotting the flow patterns in cheeses of yarn

properties of manifold threads. A so-called gauze-clearer devised a year or so ago for removing fly from gassed yarns had been operating satisfactorily on a gassing frame in a member's mill during the past year. The fly collected must, of course, be removed and experiments were now in progress to develop means for this by fitting an exhaust system to the clearers. A new Scragg double-twist frame had been installed and work was about to start on problems associated with double twist spinning, such as the variability of twist in doubled yarns.

Of interest to both doublers and manufacturers was the work on winding and beaming; much of the time of the staff had been spent in dealing with enquiries from members. The main topic of the research programme had been yarn clearing and many clearing trials have been made with cotton and cotton/"Terylene" yarns in particular. Tests of the various commercial clearers had been continued and the results for eight of them had so far been analysed; experiments with a variety of other clearers were continuing.

Work was about to start to measure the variations in the density of wound packages. It was essential, for pressure dyeing, for the cones or cheeses to have a low, even density to ensure good permeability by the dye liquor. On the other hand cones for export needed to be of as high a density as practicable. Various methods for measuring the variation in density inside such packages had been investigated but the only one which appeared to give adequate information was one that made use of a radioactive isotope inside the package. Measurements could then be made without any distortion of, or damage to, the package. This method was now coming into use.

Sizing

The use of rubber-compound squeezing rollers on sizing machines was being investigated. These rollers were being compared with conventional flannel-covered rollers and other types of covering for their effect on the take-up of size by the warp, the penetration of size into the yarn, and the regularity of distribution of size along and across the warp sheet. It was intended also, if possible, to determine the effect of the type of roller used on the subsequent weavability of the warp.

With the increasing use of synthetic fibres, various longstanding problems were thrown into relief. One of these —because of the strength of the synthetic fibres—was hairiness. For this reason it was desirable to reduce the hairiness of warps before entering the loom. This could be done by the old system employing brushes but experiments had shown that it could also be done by passing the sized, but undried warp sheet, over various arrangements of rollers so that the yarns continuously brushed against themselves while the machine was running. This self-brushing had many advantages over the use of separate brushes, including the important one that the system was, to a large extent, self-cleaning. Equipment for the full-scale self-brushing of warps had been designed and it has been established that the hairiness of warps so treated was considerably reduced, and weaving experiments were now in train to determine the effects of the treatment on weavability and loom cleanliness. Latest results showed that dustiness at the loom was reduced to about one quarter and weavability improved to the extent that warp breaks were reduced to one-third of those experienced without self-brushing. As with so much research work, new lines of thought were opened up by the experiments and in this case the results suggested that not the least important effect of the system might be on the distribution of size on and within the yarn, with consequent positive advantages not only for the synthetic fibre warps by which the work was initiated but for others, including cotton and rayon.

The device for obtaining accurate control of stretch in sizing had now been named the Q.P. - Shirley stretch regulator was now available to members and could be fitted readily to any type of sizing machine. Work on the dry-feed attachment to the automatic size box has made further good progress and an improved form of weigher was being tested preparatory to installation of the system for a mill trial.

The Shirley loom continued to occupy a considerable amount of time in the weaving department. It was being supplied in two main widths, 48 ins. running at 180 p.p.m. and 68 in. running at 155 p.p.m. Improvements to some of the ancillary mechanisms were being made as experience was gathered from running the loom under mill conditions. The loom at the Institute had been continuously occupied in weaving samples for members. Lately it had been run continuously day in and day out on a sort of extended reliability trial, in which it has given no trouble at all; the Shirley dobby is now fitted on a woollen and worsted loom. An investigation has been started on terry-towel weaving. It was decided some time ago that it would be preferable to limit the diversity of problems by devoting attention at intervals to some of the smaller and more specialised sections of the trade, completing an investigation for such a section before passing on to another. As a start a terry loom was obtained and work now proceeding for the terry weaving section.

Work was being done on the action of a cover motion, which had developed from the Institute's interest in "fitting the shuttle to the loom." It was of considerable importance to maintain the depth of the shed at the lowest practicable level in relation to the size of the shuttle. On the other hand, it was economically advantageous to project the largest possible shuttle through the warp shed. The problem was to harmonise these conflicting factors. Work on it had been very successful. In some cases it was advantageous to reduce the depth of the shed and in others to increase the size of the shuttle, on occasion, to the extent of doubling the length of yarn on the package in the shuttle. The interest in the cover motion arose from the fact that its use might sometimes permit either the use of a larger shuttle or a reduction in the depth of the shed.

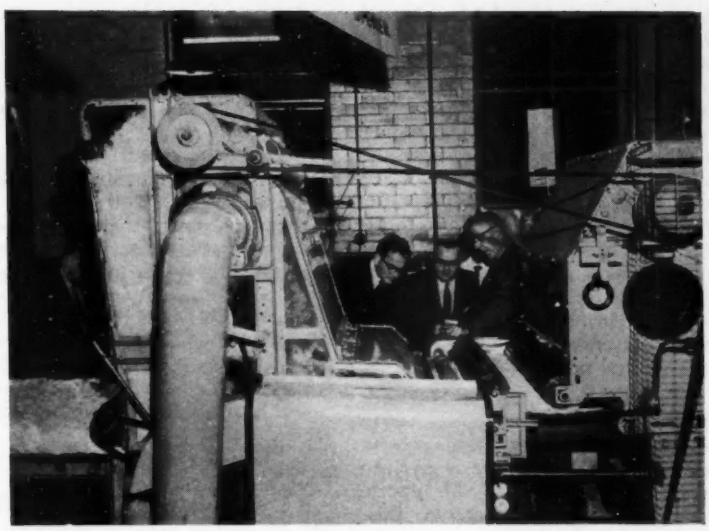
Bleaching

When the Institute started work in the early 20's the normal bleaching process for cotton goods comprised a pressure boil in alkali followed by a bleach in hypochlorite. This process had been in operation in one form or another for over a hundred years, yet its fundamental principles were far from being understood. One of the first endeavours of the Institute was, therefore, to gain a real understanding of the process, with such success that one of the commonest defects of those times—tendering due to overbleaching —was practically eliminated. The availability today of sodium chlorite made possible the development of bleaching processes that were not only free from the possibility of causing tendering but also readily adaptable to continuous processing. The one great defect of such processes was that those available hitherto could cause severe corrosion of the bleaching plant normally available. Work to date had made it possible to devise bleaching

processes that were very effective in producing a good white on materials that had not been kiered and, in addition, had little or no corrosion difficulties associated with them. This had been achieved at some sacrifice of speed of bleaching, but in such a way that with the provision of additional but very cheap plant it could be made semi-continuous, and hence integrated with continuous processing elsewhere.

The trend towards continuous processing had also been helped by working out a new method of desizing. The starch usually present in a size was normally hydrolysed to soluble and hence easily removed products by the use of enzymic desizing agents such as malt extracts. Enzymic desizing agents were now available, effective at quite high temperatures, and by using such temperatures large increases in the rate of desizing could be achieved. A method developed at the Institute comprised padding the cloth with the desizing agent, passing it over ordinary drying cylinders and completing the process by washing. This process, which utilised no equipment not ordinarily available, could therefore be completely continuous.

The flash steamer had undergone further trials which had confirmed its efficiency for the ageing of Colloresine prints, and the first production machine had been installed in a screen printing works. Work was now in progress on an oil-in-water emulsion printing system for use with the flash ager, in which tamarind seed powder was used both as film-former and emulsifying agent. Emulsion-printed fabrics were more easily dried and much more easily washed-off than fabrics printed with conventional thickenings.



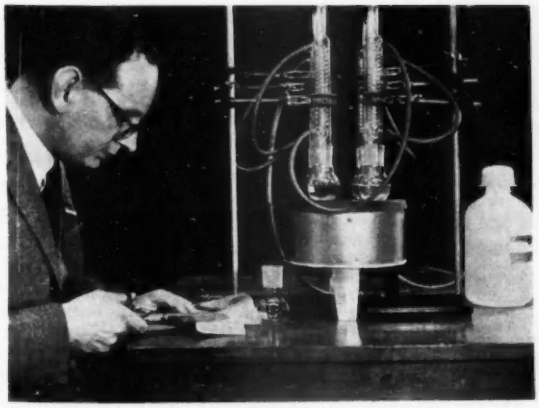
Mr. T. W. Owen explaining the mechanism of the improved Shirley opener to an interested audience

A model of the raising action indicator suitable for industrial use had been developed and fitted to a full-size raising machine. The high cost of water and the difficulty of disposing of effluent made the efficiency of washing processes increasingly important. A study of this subject had been started and a method of measuring washing efficiency was being investigated.

Silk and Rayon

In the Silk Section considerable efforts have been made to meet the challenge presented by the rapid growth of techniques for modifying the thermoplastic fibres, to give new properties, especially of bulk and handle. Two experimental machines had been installed and were giving valuable data that enable the Institute to answer the day-to-day problems of members in this expanding field. This section has also been much concerned with the stretch-breaking and spinning of fine denier "Terylene" and rayon tows on conventional silk-spinning machinery. The method had enabled fine count yarns up to 120's cotton count to be prepared by a double process involving stretch-breaking of the tows on a dandy roving frame followed by spinning on a ring or cap frame; or by direct breaking and spinning in one process on a spinning frame.

Work was going on throughout the Institute on fibre blends and as the first stage of the programme was now almost completed, it justifies a further comment. The first stage of this work was intended to show the extent to which the properties of yarns and cloths from blends of fibres reflected the properties of the component fibres, and the way in which the relations between fibre, yarn, and cloth properties were influenced by the blend proportions and the structural details of the yarns and cloths. These relations were themselves influenced by the fibre properties and work had been done on a number of fibres representing the range of load/extension and other characteristics shown by the available fibres. With the recent addition of "Acrilan" (regular and high bulk) and a nylon with low extensibility the range had been covered adequately. The work was now being completed and issued to members as rapidly as possible. Analysis of the results suggested that



Dr. T. P. Nevell prepares a Procion-dyed sample of cotton fabric, prior to stripping with hydrozine for testing purposes

for certain properties the trends with blend proportion were relatively simple and predictable for all blends though for some others the trends were complex and varied with fibre properties. These trends would be studied in greater detail in a second phase of the work which it was hoped would lead to the prediction of the properties of blended yarns and fabrics from the fibre properties alone. Good progress in this second phase had been made with respect to strength, and attention was now being turned to handle, drape, and creasability of blends in a more general programme of work.

Concluding his report Dr. Hill said: "There are five main approaches in our present philosophy. In the present state of trade the first place is given to service to members; all our efforts therefore are subservient to this. Closely following it in importance is the examination of new machinery. Thirdly, we see the industry as increasingly an all-fibre industry and increasingly we devote attention to the new fibres and to blends, upon which the future prosperity of the trade may well rest. Approaching 40% of all enquiries from members have to do with man-made fibres; our work and our budget reflect this. Fourthly, and this is linked with the new fibres, we are taking greater interest in products as distinct from processes. This is a decision of the Research Committee, and our work on cotton cellulose blankets (which are already establishing a good market for themselves), on metallised fabrics (which have already received more publicity than I care for at this stage) and, in the longer term, on flame resistance and chemical reactions of cellulose are reflection of this new trend. Last, but by no means least in a horizontally organised industry like ours, is the study of the interaction of the earlier processes in production with the subsequent ones. It is impossible technically to consider any process longer as a subject on its own. Each is one of a long sequence, affected by those which have preceded it and influencing for better or worse those which follow. It is a great merit of an organisation such as ours that this overall view can be taken."

Other Developments

This year it was probably true to say that there had never been as many new developments to show to members, and on the usual "press" day which preceded the "open days" for members, full facilities were provided to enable a comprehensive picture of research and development to be obtained.

Dealing first with the work being done in the "new laboratories" section, a new development was the production of a polarising lustre meter. A broad definition of the difference between colour and lustre could be that whereas with colour the light had actually gone into fibres and then come out again, with lustre it was perhaps due to light which was being reflected back again immediately it met the fibre. The new instrument used polarised light in an attempt to distinguish between the peculiar type of reflection which the eye interpreted as "lustre" and certain shadow effects which could otherwise completely upset lustre measurement on cotton fabric.

In the silk department, a new method of revealing lousiness in silk had been developed. The revival in silk which has been so noticeable in recent months had spot-lighted interest in this fibre. The new method was possible in the short space of 20 mins. only. The silk was treated with a nitrous acid solution to which a small amount of copper sulphate had been added. The method was then to bring it up to the boil for 10 mins. Protection of silk and nylon against tendering by light was also work which was being developed. New chemical compounds which absorbed ultra-violet light would, it was found, decrease the photo-chemical attack on undyed silk and nylon.

A good deal of work was going on in respect of soiling by laboratory methods and normal wear of garments and the effect of static. A representative said the work was not designed to develop a new anti-static agent, but was fundamental in order to show that soiling, when an anti-static agent was used, was much less on garments made from the newer fibres, such as nylon. As a result of a long series of tests on nylon lingerie, part of which had been treated by an anti-static agent and another untreated, there was no doubt but that the use of an agent did improve the resistance of the garment to soiling.

New work is proceeding in connection with package dyeing. The idea was: in order to work out flow rates inside the package, it was not possible to measure the pressure drop inside the package directly, and one resorted to electrical methods: in effect a model was made of a package, a section was removed and then the section filled with a conducting solution (water was used in the experimental work) and this conducting solution represented the yarn and there were further conductors which represented the portions where one had flow in a normal package dyeing machine, and insulators where there was no flow at all. The voltage was put inside and outside the package which represented the pressure drop inside and outside and by means of the electrical method, one could plot the line of equal pressure and from that then determine the rate of flow. This permitted one to obtain the maximum and minimum ratio of rates of flow in the package.

Work had been done in connection with washing efficiency. The high cost of water—and the recent shortage—plus the expense of effluent disposal combined to make the efficient washing of textiles increasingly important. Briefly the work consisted in measuring the electrolytic conductance of the bath and the effluent liquor in the cloth as a means of finding out what the cloth was and when it was in equilibrium. The aim was to ascertain how closely the cloth approached the equilibrium value. This was done by means of a standard conductivity measuring bridge and electrodes immersed in the tank.

Work was also being done on the flameproofing of cotton. A fundamental study of the flameproofing of cotton was now being undertaken. What was being done, said a spokesman, was to heat the cotton under controlled conditions to study its thermal break down, analysing the products, and from the analysing of the products it was hoped to find by what chemical mechanism the cotton cellulose decomposed under heat. These experiments were being done with untreated cotton and various flameproofed cottons and it was hoped from the results to find out how flameproofing treatment works. It was the beginning of a long-term programme.

Appointed Lighting Consultants

A.E.I. Lamp and Lighting Co. Ltd. has been appointed official lighting consultants for Isora ceilings, recently introduced to this country. These new ceilings are normally built up from 40-in. square light galvanised mild steel frames covered with thin non-sag P.V.C., either translucent or opaque, in a wide range of colours and patterns. Isora ceilings weigh only 14 ozs./sq. ft. installed and provide thermal insulation without losing existing natural daylight. They are used to create a variety of features and will transform unattractive premises into warm and attractive interiors. They are being marketed in the U.K. for the first time by S.F.I.M. (Great Britain), 220 Bedford Avenue, Slough, Bucks.

New Textile Slide Rule Speedily Solves Calculations

Features and operation of new instrument which rapidly gives answers when calculating loom efficiencies, yarn count conversions, weights of yarn and cloth, twist problems, and moisture regain percentages, etc.

By "TECHNOLOGIST"

DESIGNED to assist in the calculation of specific textile problems, a new textile slide rule is constructed like most slide rules and ordinary multiplication, division, powers and extraction of roots are made as on an ordinary slide rule. There are, however, some differences, for example, at the base of the stock, is a Scale Z1 which starts at 3·8 on the right hand and goes to 300 and infinity at the left. This is used in conjunction with scales Z2 and Z3 on the underside of the slide, and which have to be inverted to work with scale Z1.

These scales can be usefully employed when making twist, regain and percentage moisture content calculations. Another feature is the cursor which, wider than usual, has engraved on its face constants indicating the various counting systems including the universal "tex" and denier systems (Fig. 1). This cursor works together with scales (B) and (B1) for the conversion of counts.

Specific Textile Calculations

Problems in loom efficiency can be quickly solved by the rule in the following manner. For example, a loom runs at a speed of 100 p.p.m. Run out a table of production in thousands of picks per 8-hour day, taking into account an efficiency of 75%. The following formula could be used in the construction of the table.

$$\text{Production in picks} = \frac{\text{Picks/min.} \times \text{Working time in min.} \times \text{Efficiency}}{100}$$

$$\text{Production in picks} = \frac{100 \times 60 \times 8 \times 75}{100} = 36{,}000$$

$$\frac{36{,}000}{1{,}000} = 36 \text{ thousands}$$

The above can be solved and a table produced for that particular loom speed as shown.

Set	(A)	Working time in minutes	480 = 60 × 8 minutes			(48)
	(B)	Picks/min.	100 = 100 p.p.m.			(10)
Read	(A)	Production in picks + 1,000	36	38·4	40·8	43·2
	(B)	Efficiency %	75	80	85	90

If a large number of looms are run at the same speed and the production or efficiency is required, the working time in minutes × number of loom is set on scale A. From the above table the percentage efficiency for any given value per period, or picks per period for any given percentage efficiency can be quickly obtained.

Conversion of Yarn Counts

The large cursor is specially engraved with single lines having the symbols T. C. etc., denoting the various count systems. Count conversion of a given system is carried out by setting the cursor line for the particular system, over yarn count on scale (B) or (B1), then reading the corresponding counts under the other cursor line. Fixed weight systems, such as the worsted system are set on scale B, and fixed length systems such as the denier (weight of 9,000 metres in grams) and the new system Tex (weight of 1,000 metres in grams) are set on (B1).

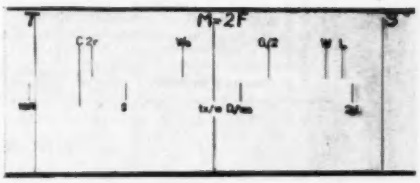


Fig. 1. A reproduction of the cursor showing constants indicating the various counting systems

This single setting provides the following information"—

First **On scale (B) under cursor lines—**

T: Typp = 8·4
2r: American run (woollen) r = 10·5 ÷ 2 = 5·25
Wo: Worsted = 15
M: 2 F Metric = 16·94
F French (old system) F = 16·94 ÷ 2 = 8·47
G/2: Galashiels (woollen) G = 21 × 2 = 42
W: West of England = 26·25
L: Linen = 28
S: Yorkshire skeins = 32·8

Secondly **On scale (B) under cursor line—**

10R: Roving (drams per 40 yds.) 12·2 ÷ 10 = 1·22
T: lbs. per 100,000 yds. = 11·9
C: grains per 12 yds. = 10
G: grains per 10 yds. = 8·33
tx/10: tex (grams per 1,000 metres) = 5·9 × 10 = 59

$$\text{tex} = \frac{\text{grex}}{10} \text{ (grams per 10 kilo. metres)} = 590$$

D/100: Denier = 5·32 × 100 = 532
2J: Jute = 3·43 ÷ 2 = 1·715
S: drams per 100 yds. = 3·05

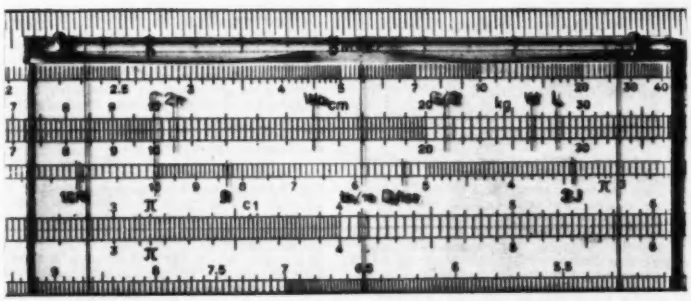


Fig. 2. Rule is shown set to convert 10s cotton counts into any other system

Example.—**Convert cotton count 10s into any other system.**

Set index marks 1 of scale (A and B) together to avoid confusion, and then move mark C on cursor over number 10 on scale (B) as shown in Fig. 2.

It is not possible to remember the meaning of all the symbols on the cursor, but they can easily be recalled to mind by reversing the whole slide, for on the back is engraved the example quoted above with an explanation of each symbol. This is illustrated in Fig. 3a.

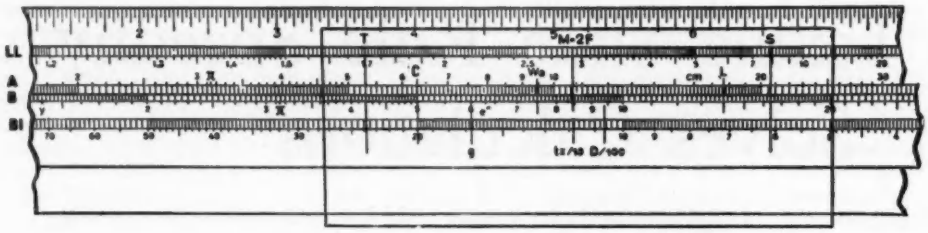


Fig. 3. The solution to the problem

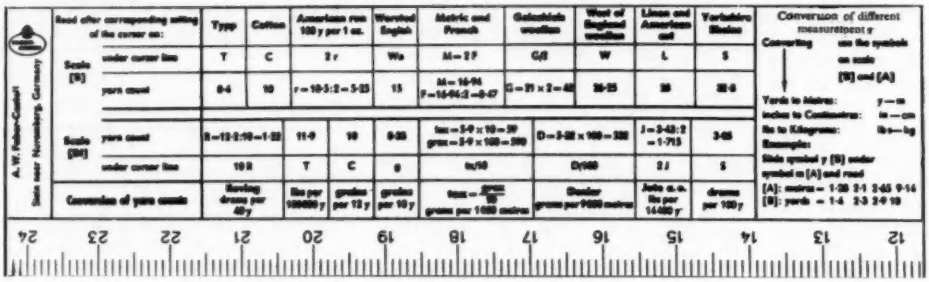


Fig. 3a. The reverse side of the rule, with the different conversion measures

Example.—**Convert the (tex) counts 150 into any other system**

tex 150 = Grex 1,500

$$\text{Move cursor line } tx/10 = \frac{150}{10} = 15 \text{ on (B1)}$$

Now read on (B) scale—

(i)	T	C	2r	Wo	M = 2F	G/2	W	L	S
	3·31	3·94	4·14	5·9	6·67	8·25	10·3	11	11·9

r = 2·07 F = 3·33 G = 16·5

(ii) on (B1) scale—

10.R	T	C	g	D/100	2J	S
31	30·3	25·4	21·2	13·5	8·72	7·75
R = 3·1	lbs. per 100,000 yds.	grain per 12 yds.	grain per 10 yds.	(D = 1,350)	(J = 4·36)	drams per 100 yds.

In the worsted drawing and spinning operation it is often necessary to convert worsted count to number of grains per 40 yards for reeling purposes. In this case Wo is brought to (A5) and kept in this position. The counts to be converted are found on scale (B) and brought to line Wo and grains per 40 yds. are found over B100, B10 or B1.

Therefore, to convert 10 worsted to grains per 40 yds.:—

Set Wo to 5 scale (A) 49·8 grain per 40 yds.
Slide to 10 scale (B) above B100

If it is desired to make a table of conversion from one count to one other only, and it is for two fixed weight systems, proceed as follows:—

Example.—**Make a table of counts from cotton to worsted and conversely.**
Move C on cursor over index 1 of scale (A) or any other convenient figure, then set index 1 of Scale (B) to Wo and read:—

on Scale (A) Worsted	1·5	7·5	30	75
Scale (B) Cotton	1	5	20	50

To convert a fixed weight count to a fixed length count use Scales (A) and (B1).

Weight Calculations for Yarns and Cloths

The cursor lines can be employed to calculate the weight of yarn and cloth, counts of yarns from length and weight or length from counts and weight. To enable this to be done quickly, use is made of the cursor line T. for T.Y.P.P. in every calculation together with the cursor line for the particular count in question.

The following calculations are based on the formula

$$\text{Weight in lb.} = \frac{\text{Length in yards}}{\text{TYPP} \times 1{,}000 \text{ Length in yards}} = \frac{\text{counts} \times \text{conversion factor}}{1{,}000}$$

Example.—**How many lbs. does 25 pirns each containing 530 yds. of 2/10 cotton weigh. 2/10s = 1/5 cotton.**
Set cursor line T over (A5.3) and (B5) under line C. We find in (B Scale) TYPP counts 4·2 = 5 cotton, and at the same time length in yards ÷ TYPP = 530 ÷ 4·2 is set on Scale (A) under index 1 = ·126 lb.
To find weight of 25 pirns look above Scale (B25) and on Scale (A) find 3·15 lbs. By this simple setting of the rule we can find the weight of any number of pirns, by reading above the number on (B) the weight on (A).

If the counts are to be found from length and weight, proceed as follows. Set index on (B) to weight on (A) and under the various symbols on cursor, find the counts; for example, with the above given problem—

M = 8·47 L = 14 S = 16·4
D/100 = 10·62 × 100 = 1,062

Fig. 3 illustrates the above working.

Example.—**A warp 60 yds. long consists of 530 warp ends of 10 Yorkshire skeins. Calculate its weight in lbs. ?**
Move Line T to 5·3 on (A) and (B10) to line S, and above 60 on (B) find 124 lbs. on (A).
The weight of weft yarn can be calculated in a similar manner.

Example.—**A cloth has 20 ends per in., 64-in. wide in loom, 60 yds. long and is made with 10 Yorkshire skeins.**
Move Line T to 20 × 64 = 128 i.e. (A1·28) bring B10 to line S and above (B60) find 30 lbs.
Metric units of measure can be calculated in the same way, by using line M instead of T.

Example.—**A cloth 200 metres long consists of 1,067 ends of 7·5 worsted. How many kilograms does the warp weigh ?**

Solution.—**Place M over 10·67 on (A) and (7·5B) under line Wo. Weight of warp is given over (B2) as 25·25 kilograms. This is illustrated in Fig. 3.**

In the analysis of a cloth it is often required that the counts of the yarns be found. The usual procedure is to weigh 1 yd. of the yarn (i.e. 18 threads cut from a 2-ins. pattern) in grains and then calculate the count.

Using the rule the counts can be found in all the various systems by one setting.

Example.—**One yd. of worsted weighs 2·5 grains. Calculate the count ? Set line G to (25B1) and under line Wo is found 5s worsted. Other counts of yarn can be read off with the same setting. Galashiels 7 × 2 = 14; Denier 16 × 100 = 1,600; Yorkshire skeins 9·15.**

Again it may be necessary to convert ozs. or lbs. per yard of cloth to kilograms per metre.

Provision is made on the rule for this type of conversion. Use is made of the marks Y (yards) on (B) and M (metres) on A. These are placed in coincidence and at once a table of conversions from yards to metres or metres to yards is made.

Set Mark Y on (B) to Mark M on (A).

Read A Metres	1	2·28	9·14
B Yards	1·094	2·5	10

With this setting and with the aid of four cursor lines the following conversions can be obtained:—

$$\frac{\text{T}}{\text{tx/10}} = \text{lbs. per 1 yd.} \qquad \frac{\text{G}}{\text{S}} = \text{grains per 1 yd.}$$

kilograms per metre drams per 1 yd.

Example.—**A 16 ozs. (1 lb.) per yard cloth—convert to kilograms per metre.**
Set T to 100 (B) G = 70 × 100 = 7,000
tx = kilograms per metre = ·496;
S = drams per yard = 256.

A reminder of these different conversion measures can be found on the reverse side of the rule (Fig. 3a).

Twist Yarn Calculations

When calculating the resultant counts of a folded yarn based on a fixed weight system, the following formula can be used. $\frac{1}{T} = \frac{1}{A} + \frac{1}{B}$ where T = resultant count and A and B are single counts, which can be arranged as below.

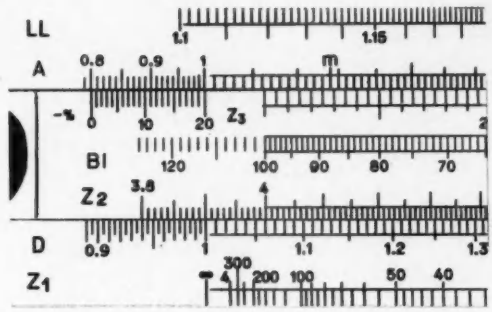


Fig. 4. The setting to give the correct result in example 1

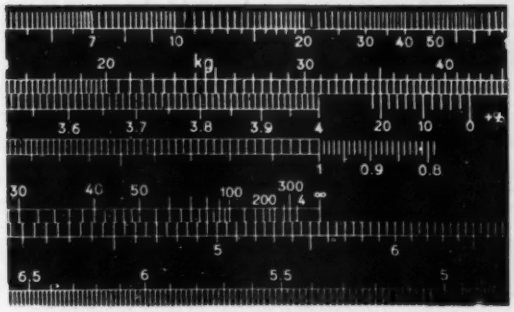


Fig. 5. The setting to give the correct result in example 2

$$\frac{1}{T} = \frac{1}{A} + \frac{1}{B}$$

$$T = \frac{A \times B}{A + B}$$

For a 3-fold yarn we have $\frac{1}{T} = \frac{1}{A} + \frac{1}{B} + \frac{1}{C}$

$$\frac{1}{T} = \frac{(A \times B) + (A \times C) + (B \times C)}{A \times B \times C}$$

which gives $$T = \frac{A \times B \times C}{(A \times B) + (A \times C) + (B \times C)}$$

With the aid of the scales Z1, Z2 and Z3 the resulant count of 2-, 3- and 4-fold yarns can be quickly found.

To make these calculations for twisted yarns the rule must be inverted so that scales Z2 and Z3 are upright on face of rule.

The resultant count of two or more single yarns are calculated with the aid of scales Z1 and Z2, as described below.

Example.—**Calculate resultant count of a 2-fold yarn made with a 20s and 30s. To find the resultant count, move (Z2 30) over (Z1 20) with the aid of any long cursor line. The result is found above the infinity mark on Z1 (i.e. 12). The answer can also be found on Z1 below infinity mark on Z2.**

Example.—**It is required to produce a 2-fold yarn equivalent to a single 12s. Find what counts of singles will produce this.**
Set (Z2 12) over (Z1 ∞). Those single counts which are exactly opposite each other will produce the required resultant count as shown.

(A) on Z2	15	20	24	33	40
(B) on Z1	55	30	24	18	16

Any suitable single counts indicated by this setting cou'd be utilised to produce the folded yarn.

To find the resultant count of a three-fold yarn proceed as follows:—

Exampl'e.—**Calculate resultant count of a yarn which consists of a 1/24s, a 1/12s and 1/6s.**
To solve place (Z2 24) over (Z1 12). Then any cursor line over (Z2 ∞), then place (Z2 6) under cursor line. The resultant count will be found on (Z3) under graduation ∞ on scale (A) which is 3·43s approximately.

Note.—**When inffinity mark ∞ on scales Z1 and Z2 is off the scale, we must use (Z3) for final result.**

Example.—**A 3-fold yarn has a resultant count of 8s. Two singles of this twist are 30s and 24s. What is the counts of the third single ?**
To solve, set (Z2 24) over (Z1 30). Bring long cursor line to (Z2 ∞), (Z2 8) over (Z1 ∞) and we have the third count 20s under cursor line on (Z2).
Fig. 7 shows the reverse side of the rule on which is engraved an example of a twist calculation to serve as a reminder.

Other problems such as percentage composition and quantities may be solved by the rule. For example, 45 lbs. of a three-fold yarn, given in preceding examples is equivalent to 8s. Find (*a*) quantities of each single yarn, (*b*) percentage composition of singles in the twist.

When seeking a solution to this kind of problem, it is to be remembered that the higher the yarn count of the singles the smaller is the weight. Therefore, we have an example of indirect proportion and the required values must be set to read on scales (A) and (B1). The following shows how a table can be produced when solving these two problems.

In the examples given it has been assumed that there has been no take up or contraction due to twisting. In practice this contraction of single yarn takes place and must be taken into account in the calculation. It will be noted that the greater the twist contraction, a shorter length of twist yarn is produced and the counts of the resultant twist thread would be lower than a result which did not take into account the contraction.

(a) Count 8s Weight 45 lbs.	(A) Counts of singles (B1) Yarn weights	(A) 20 24 30 (B) 18 + 15 + 12 lbs. = 45 lbs.
(b) Count 8 100%	(A) Counts of singles (B) % of weights	(A) 20 24 30 (B) 40 + 33·4 + 26·6 = 100%

For example, if the length of a twisted yarn was ·87 of a yard and was produced from 1 yard of each single then contraction is 13%, i.e. 1 — ·87 = ·3 expressed as a decimal fraction. This percentage contraction can be termed (— percentage) or loss percentage. However, the take-up will be (·13 ÷ ·87) × 100 = 15% if based on the twisted length. This is termed (+ %) or percentage gain.

To correct the counts of the singles, use must be made of the two short scales on the left and right of Z3 scale and which have always to be used with scale A.

After inverting the scale, use scale on left marked — % to calculate loss %, and a scale on right marked + % to calculate % gain.

The practical use of these two scales is illustrated in the following examples.

Example 1.—**The resultant twist count obtained by calculation is equal to 9·2. If twist contraction (shortening of all singles) was 13%. What is effective twist count ?**
This is an example of — % or loss %.
To solve, place percentage 13 on short scale on left to 9·2 on scale A and read result on (A) over zero mark on short scale, i.e. correct twist count = 8s.

Example 2.—**It is desired to produce a 2-fold twist yarn, with a resultant count of 12s. Suggest suitable counts of singles if take up for each yarn is 5%, i.e. gain %.**
From the table which gives a range of single counts for a resultant count of 12s, we find

pairs	15	20	40
	55	30	17·1

Using the short scale on the right, set %5 on scale to (A40) and read result 42 over 0%. Then under 17·1 read result 17·8. This gives a result which states that to obtain a twist count of 12s the two singles counts 42 and 11·8 must be used with a twist take up of 5%. These two examples as illustrated in Figs. 4 and 5, respectively.

Weight Losses

The loss of weight in cloth finishing makes yarn and cloth lighter, contraction during weaving and milling shrinkage has the reverse effect. Such changes may be quickly calculated by the use of the two short scales. For example, A yarn equal to a count 20s finished has shrunk 10% and lost 15% in weight. Calculate counts of yarn in loom. In this case both short scales must be used as follows:—

1*st.*—**Take shrinkage; to find original we use + % scale, i.e. set (A20) to + 10%, above 0% find 22 on scale (A).**
2*nd.*—**Taking loss of 15%, to find original use — % scale. Set — 15% to 22 on scale (A) and above — 0% find 18·8.**

Official or standard regain are the amount of moisture which is allowed on the dry weight of most textile materials for testing and commercial purposes. For example, worsted yarn has an official regain of 18¼% which means that 100 lbs. of bone dry yarn can have 18¼ lbs. of moisture added, and for commercial purposes it could be sold at a weight of 118¼ lbs. However, the percentage moisture content of that material which is at correct condition weight is not 18¼% but 18¼ ÷ 118¼ × 100 = 15·43%. The above applies in all cases where the

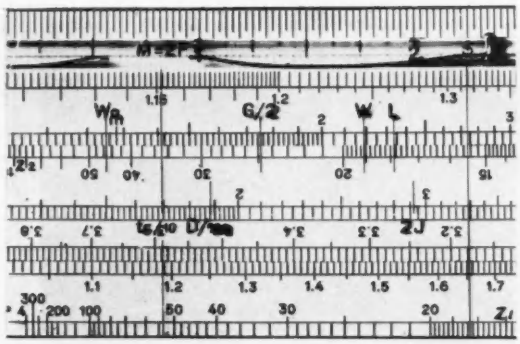


Fig. 6. Rule set to show regains on Z1 and percentage moisture content on Z1

regain is a specific figure and the percentage moisture content is always less than that figure.

Regain could be expressed as % addition (+ %).

Moisture content could be expressed as % loss (— %).

Using the rule we can compile a table for the conversion of loss percentage to percentage addition. To do this, first invert slide so that Z2 scale is against scale (A) and so runs in the same direction as scale Z1.

Note.—**If 100% is added to anything the value is doubled. Therefore, 1 becomes 2: 4 becomes 8 and so on, but the loss percentage on these two values 2 and 8 are 1 ÷ 2 × 100 = 50%, 4 ÷ 8 × 100 = 50%: are as shown 50% in each case. Therefore, that a loss of 50% = percentage addition of 100.**

Set value 50 on Z2 (inverted) opposite 100 on Z1 and any value (+ %) on Z1 is converted to (— %) on Z2 (inverted).

50 (Z2)

Inverted — % 20 15·43 %Moisture content 100 (Z1)

Inverted + % 25 18·25 Regain

Using the rule as set we find regains on (Z1) and percentage moisture content on (Z2) (see Fig. 6).

Example.—**Regain cotton 8·5%, % moisture content = 7·825. Scoured wool 16%, % moisture content = 13·79.**

The above explanations and problems can be considered sufficient to show how valuable this textile slide rule could be and, in addition to the examples given, tables for draft and twist, change wheels, setting of cloths, tables of twists in yarn and countless other textile problems can be produced on this instrument.

The slide rule is a mechanical aid to calculation; a "labour saving" device by means of which many mathematical calculations can be performed with little expenditure of time and energy. Some people, appear reluctant to learn the methods of employing this most useful instrument, even when they posses one. This could be due to the fact that at first their calculations with the rule are more troublesome and take longer than when worked in the ordinary manner. To become familiar, with any slide rule, one should use it upon every conceivable occasion.

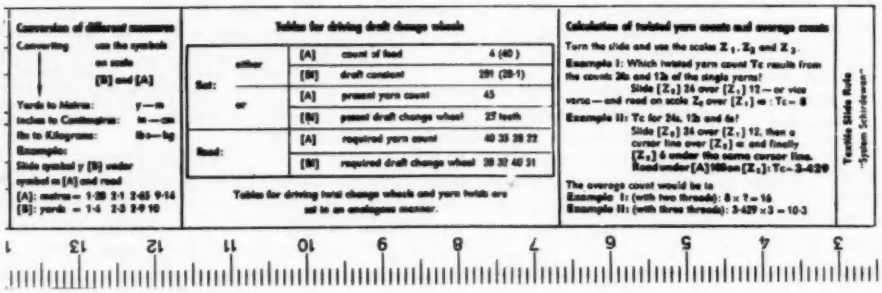

Conversion of different measures
Converting
use the symbols on scale
[B] and [A]
Yards to Metres: y — m
Inches to Centimetres: in — cm
lbs to Kilograms: lb — kg
Examples:
Slide symbol y [B] under symbol m [A] and read
[A]: metres = 1·28 2·1 2·65 9·14
[B]: yards = 1·4 2·3 2·9 10
Tables for driving draft change wheels
either
but:
or
Read:
[A] count of Read 4 (40)
[B] draft constant 291 (29·1)
[A] present yarn count 45
[B] present draft change wheel 27 teeth
[A] required yarn count 40 35 28 22
[B] required draft change wheel 28 32 40 51
Tables for driving twist change wheels and yarn twists are set in an analogous manner.
Calculation of twisted yarn counts and average counts
Turn the slide and use the scales Z1, Z2 and Z3.
Example I: Which twisted yarn count Tc results from the counts 2/8s and 1/2s of the single yarns?
Slide [Z2] 24 over [Z1] 12 — or vice versa — and read on scale Z3 over [Z1] ∞ : Tc = 8
Example II: Tc for 2/4s, 1/2s and 6s?
Slide [Z2] 24 over [Z1] 12, then a cursor line over [Z2] ∞ and finally [Z2] 6 under the same cursor line. Read under [A] 100 on [Z3]: Tc = 3·429
The average count would be is
Example I: (with two threads): 8 × 2 = 16
Example II: (with three threads): 3·429 × 3 = 10·3
Textile Slide Rule "System Schirdewan"
13 12 11 10 9 8 7 6 5 4 3

Fig. 7

NEW HAND TACHOMETER

A NEW hand tachometer—the ATH.24—announced by Smiths (Industrial Instrument Division), Chronos Works, North Circular Road, London, N.W.2, will have great appeal to home and export markets, for use with machinery of speed ranges of up to 4,000 r.p.m., when it is preferable to use a tachometer especially designed to suit this range. The new model has a range of 0 - 400, 0 - 2,000 and 0 - 4,000 r.p.m. The dial is calibrated with a dual scale—black figures on white—the outer scale 0 - 2,000 r.p.m. and the inner 0 - 400 r.p.m. The set comprises: hand tachometer; male rubber centre; female rubber centre; extension piece; disc for surface and cutting speeds (feet or metre reading); and a robust case.

With this equipment, accurate checks can be made on rotational speeds, linear speeds and surface speeds. Indication is instantaneous, the instrument is not damaged by sudden acceleration, and when desired, a pointer lock device holds the reading; this is of great value when the tachometer is obscured while in use. Stated to indicate r.p.m. or surface speeds to an accuracy of ± ½%, the instrument is unaffected by position, humidity, or wide ranges of temperature.

Loop and Knop Effects in Mantlings, etc.

Reproduced approximately 7/12ths size, linear, the distinctive patterns on the facing page are a small selection from the high quality cloths manufactured by Pearson Brothers Ltd., Victoria Mills, Golcar, Huddersfield. Brief details are as follows:—

(1) Broad bands of lustre worsted loop yarns—warp- and weft-way—produce this smart block pattern. In a soft, lilac shade, it is a 17 - 18 ozs. lambswool mantling.

(2) An 18 ozs. worsted-wool mantling featuring double-toned loops—light green and white—on a light fawn and white striped ground.

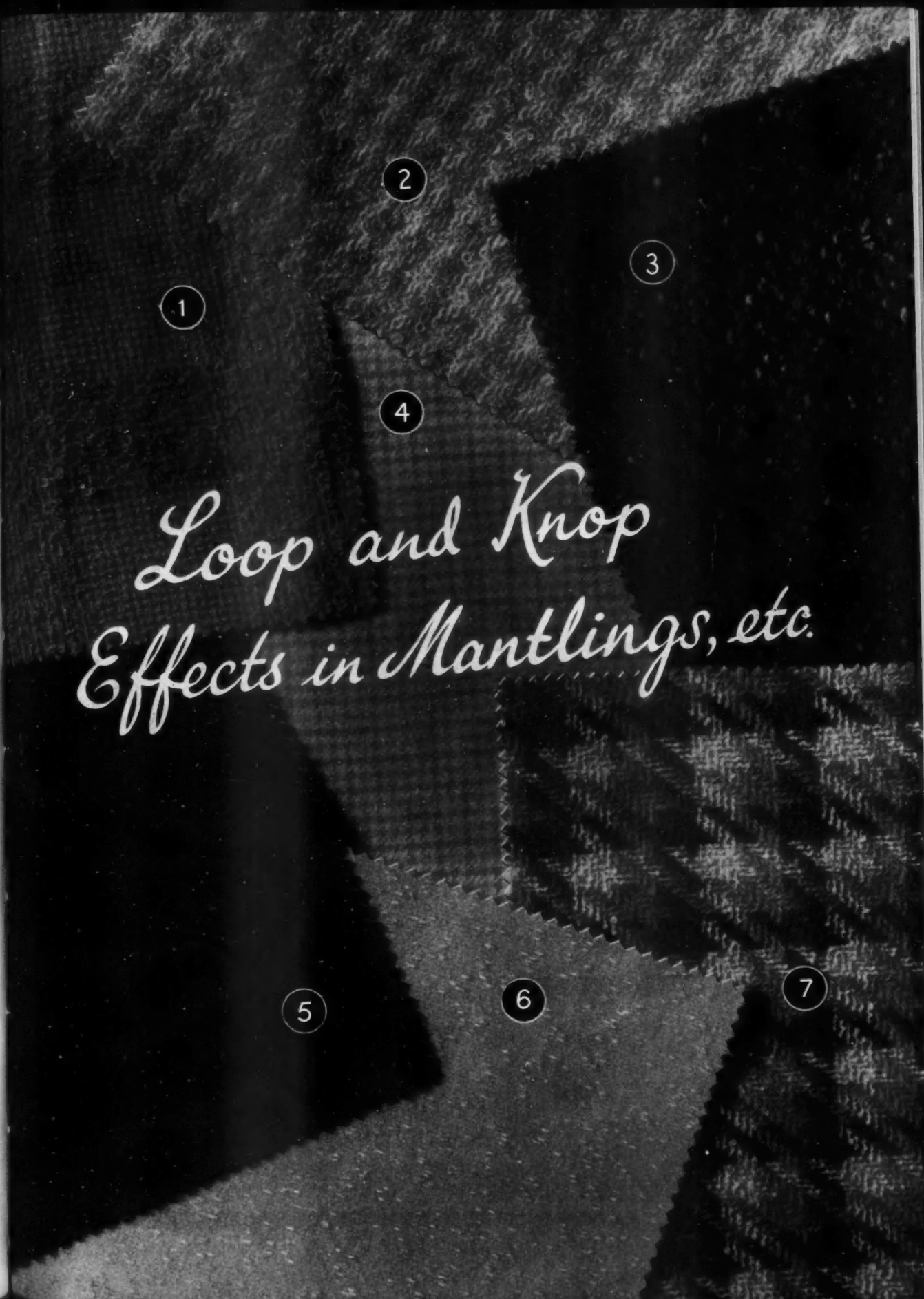
(3) Black and gold are the two colours employed in this 20 - 21 ozs. lustre worsted loop and wool mantling.

(4) White, pale blue and fawn yarns give the neat, squared design in this 13 - 14 ozs., 100% lambswool skirt cloth.

(5) A delightful squared effect in royal blue and grey. It is a 12 - 13 ozs. brushed mohair and lambswool skirt cloth.

(6) Random spot yarns enhance the appeal in this 13 ozs., 100% worsted needle-cord in an overall shade of pale daffodil.

(7) A lovely variation on two basic designs. Brown, fawn and white yarns are combined in the most effective manner to give this 17 - 18 ozs. worsted-wool mantling.


2
3
1
4
Loop and Knop
Effects in Mantlings, etc.
5
6
7

'Shirley'

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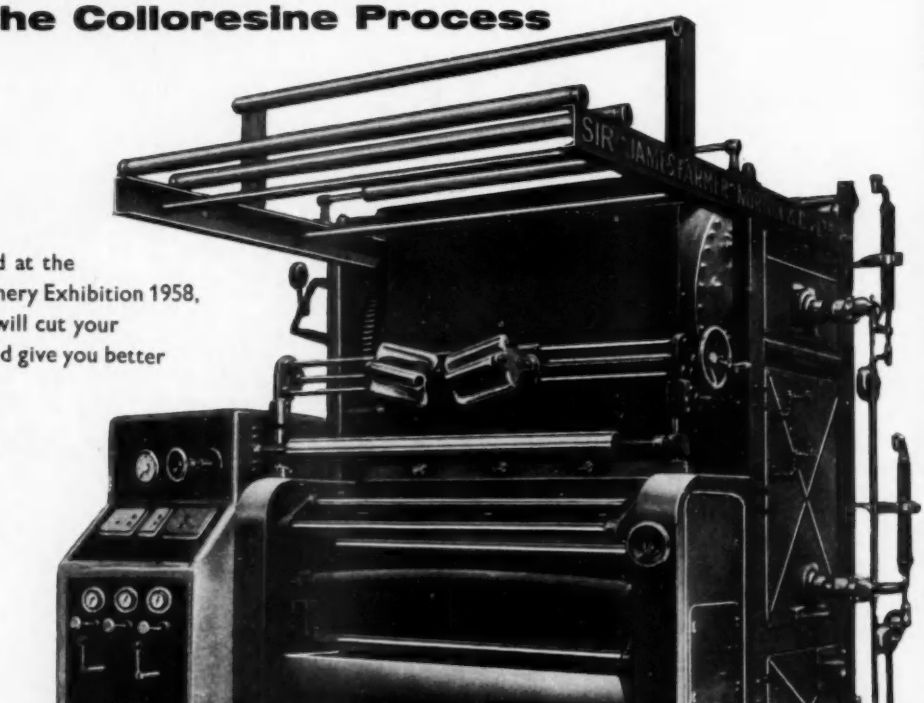

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The Organisations of the Cotton Industry*

No miracle of reorganisation can be achieved by imposing apparently ideal organisations on an industry with an unreformed structure. If the firms are reconstructed it will not take them long to create organisations to serve their purpose

By H. A. CLEGG and R. M. HARTWELL†

WHEN we undertook to write this paper the problem of the cotton industry's organisations was put to us as another problem of excess capacity: the industry has shrunk to less than half peak size, but has retained all the organisations it had then. Can it afford to support them? Investigation soon convinced us that this was a most misleading way of putting the problem for, by a new variant of Parkinson's law, the industry seems to have thrown up new organisations in proportion to the decline in output and employment. The original cotton employers' organisations were formed to deal with the unions. At first their aim was to hold back or to destroy the unions, but soon they settled down to negotiate wages and conditions of work, and this has remained the central function of the older organisations. In some other industries the desire to co-ordinate prices was a second important motive for combination even in the nineteenth century, but the interest of the cotton industry was aroused more recently, as a consequence of declining markets.

Since then it has become one of the reasons for the birth of new organisations, for although some attempts to control selling prices have been made by the organisations already in existence, several groups decided to create new bodies for the purpose. A third and associated reason has been the desire to limit output and to get rid of surplus capacity. These two considerations, of course, led to the foundation of the Joint Committee of Cotton Trade Organisations and were to have been the primary functions of the first Cotton Board.

A fourth motive for combination has been provided by increasing government intervention in industry and the consequent desire of governments to consult with industry's representatives. Once more the old organisations have undertaken the new task, but a number of groups of employers have felt that their peculiar interest could not be represented by any existing organisation and have set up new bodies. A fifth source of additional organisations has been the development of new fibres. Synthetic fibres led not only to separate organisations of their producers, but also to the separating out of rayon staple spinners, rayon weavers, and other constituents of the British Man-Made Fibres Federation. Finally, there have been personal considerations. They must be included in any explanation of the origin of the Yarn Spinners' Association as a separate organisation from the Federation of Master Cotton Spinners' Associations, and of the British Rayon Research Association as a separate organisation from Shirley Institute.

When we listed all the new bodies formed to meet the needs we could not avoid the conclusion that, in its decline, the cotton industry has developed a host of organisations for which it felt no need in its prime. And having reached this conclusion, we inevitably asked whether all were necessary. Indeed the organisational structure is now so complicated that our first reaction was to look for a plan of rationalisation. Several schemes had already been suggested, and others were put to us during our investigation.

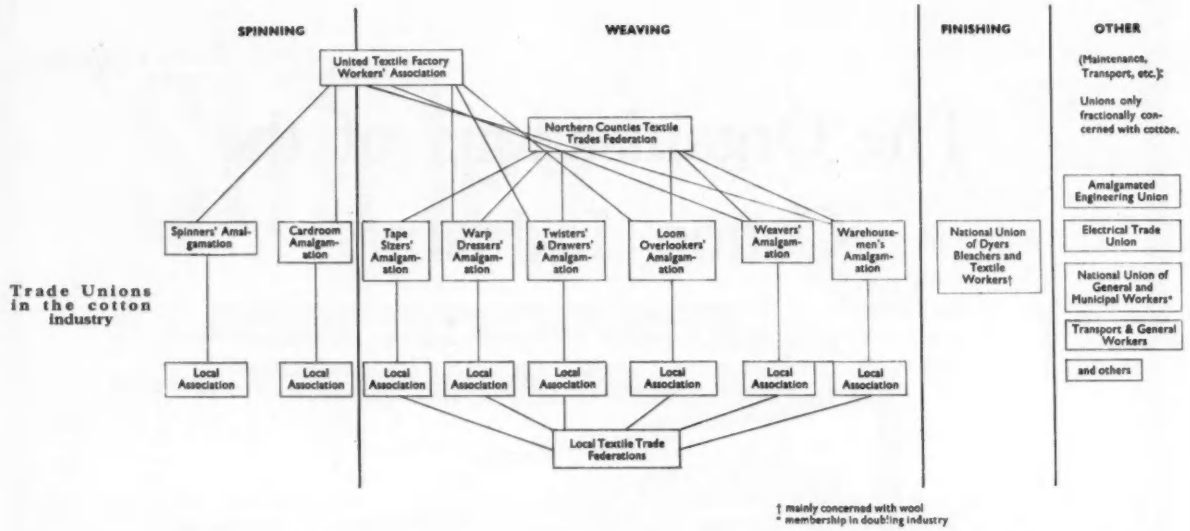
Unions' and Employers' Associations

The structure of industrial associations is usually determined either by the process or by the product. The process determines the type of labour employed, and the structure of organisations for dealing with labour matters is therefore settled on this principle. The process, however, may not lead to a homogeneous group of products. The most obvious example is the engineering industry in which skilled fitters are used in making products as different as aircraft and bicycles. Trade unions have a single dominant

Pictured at the Conference are (l. to r.) Mr. H. A. Clegg (Fellow of Nuffield College, Oxford), Mr. F. Rostron (member of the Cotton Board and a director of Ferranti Ltd.) and Mr. R. M. Hartwell (Fellow of Nuffield College, Oxford)

* *Abstract of a paper given at the recent Cotton Board conference at Harrogate.*

† *Mr. Clegg and Mr. Hartwell are both Fellows of Nuffield College, Oxford.*



interest—to establish control over the conditions of their members' working lives. Consequently they are far less interested in the product than in the type of labour employed, and whatever form of organisation this interest determines can equally well serve to represent their interests to the outside world.

The structure of British trade unionism is the most complicated in the world. Any attempt to classify them by the normal categories of craft union, industrial union or general union, rapidly breaks down, because most unions are exceptions to all three categories. In many other countries the industrial union has been accepted as the most convenient type of organisation, but, despite a number of attempts, Britain has not followed suit and seems unlikely to do so. Even if it were admitted that industrial unionism was the model for Britain, the cotton industry at least approximates to the ideal, for (apart from the finishing trades) the major cotton unions are confined to the cotton industry and between them organise the great majority of cotton trade unionists. If spinning and manufacturing are separate industries then manufacturing has an industrial union, for the Weavers Amalgamation dominates manufacturing, and is federated with the minor unions for the purpose of collective bargaining. Moreover, when the present reorganisation scheme is carried through it seems likely that the Spinners Amalgamation will be reduced to the position of one of the minor craft unions of the industry and the Card Room Amalgamation will become the dominant union in spinning. (In April 1959 5¼ million mules were running. It seems that by April 1960 all but 3 million mules will have been scrapped.) This is a structure far more simple than, for example, in the engineering industry, or indeed in most of Britain's other industries. The only questions which remain are whether the powers of the individual associations within each amalgamation are too great, and whether the United Textile Factory Workers Association, which brings together the trade unions both in spinning and manufacturing (mainly for political purposes), should not be given greater powers to deal with industrial matters.

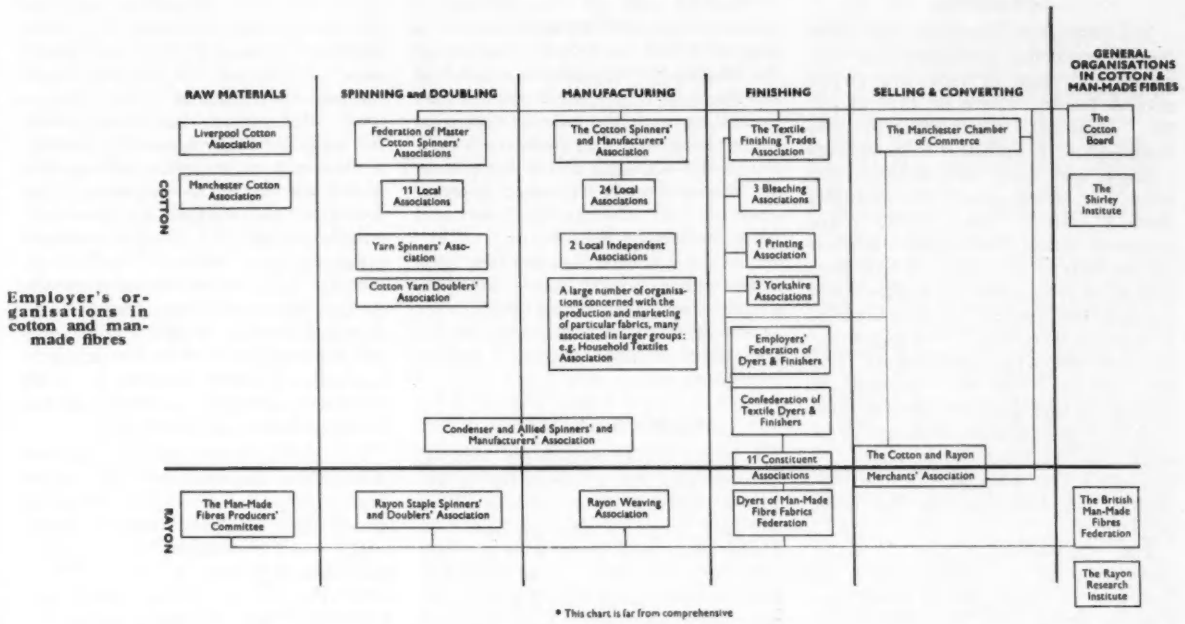
Where clear-cut regulatory functions are not present it is difficult to distinguish between a real interest with a need for representation and obstinate clinging to traditional forms of organisation which no longer meet the needs of the times. For the purpose of our argument, however, we propose to make a strict application of the criteria which we have adopted, and to reject all organisations whose justification is not firm and clear. Since price maintenance, for the most part, has been brought to an end in the industry, and since the discussions on the proposed merger of the British Rayon Research Association and the Shirley Institute suggest that the rayon producers are coming to see that they have more in common with the cotton industry than they had recognised in the past, the times are perhaps propitious for talk of this kind.

Along with this amalgamation, therefore, we can envisage the possibility of merging the Yarn Spinners, the Yarn Doublers and the Staple Rayon Spinners into the Federation of Master Cotton Spinners, of amalgamating the Cotton Spinners and Manufacturers Association with the Rayon Weaving Association, and perhaps reducing the number of organisations in the finishing trades, particularly the large number of small associations in the dyeing section. The British Man-Made Fibres Federation would cease to exist, and where joint action was required the rayon producers would be linked formally or informally with the major cotton organisations. This would reduce the complexity of the industry's organisation, although it would still be far from neat and tidy. But would that be sufficient justification for a change which would require a great deal of effort, tact and skill (and a number of individual sacrifices)? What other advantages would follow?

Cost

The main cost of most of the organisations are their salaries. In other words, their main claim is on the industry's resources of manpower. The total staff of the cotton employers' organisations is about 150, and roughly the same number work for the Cotton Board. The total full-time staff of the cotton unions proper is rather less, about 120. The biggest employer is Shirley Institute, whose total staff comes to some 450.

The costs and claims on manpower resources are modest, for both employer and worker, and most of them would have to be met whatever scheme of rationalisation was adopted. The figures show that the largest economies could be obtained by merging the research institute, although it would no doubt take some


Employer's organisations in cotton and man-made fibres
RAW MATERIALS
SPINNING and DOUBLING
MANUFACTURING
FINISHING
SELLING & CONVERTING
GENERAL ORGANISATIONS IN COTTON & MAN-MADE FIBRES
COTTON
RAYON
Liverpool Cotton Association
Manchester Cotton Association
Federation of Master Cotton Spinners' Associations
11 Local Associations
Yarn Spinners' Association
Cotton Yarn Doublers' Association
The Cotton Spinners' and Manufacturers' Association
24 Local Associations
2 Local Independent Associations
A large number of organisations concerned with the production and marketing of particular fabrics, many associated in larger groups: e.g. Household Textiles Association
The Textile Finishing Trades Association
3 Bleaching Associations
1 Printing Association
3 Yorkshire Associations
Employers' Federation of Dyers & Finishers
Confederation of Textile Dyers & Finishers
11 Constituent Associations
The Manchester Chamber of Commerce
The Cotton and Rayon Merchants' Association
The Cotton Board
The Shirley Institute
Condenser and Allied Spinners' and Manufacturers' Association
The Man-Made Fibres Producers' Committee
Rayon Staple Spinners' and Doublers' Association
Rayon Weaving Association
Dyers of Man-Made Fibre Fabrics Federation
The British Man-Made Fibres Federation
The Rayon Research Institute

* This chart is far from comprehensive

time for all the possible savings to be realised. Even in the long run, however, the savings could not exceed the present cost of the smaller organisation. Members of employers' associations might obtain advice on rating, work study and so forth, from consultants, but the total cost would not necessarily be less, nor the service more efficient. Indeed, the Federation of Master Cotton Spinners Associations, a large part of whose income covers insurance against accidents, claim that the cost would rise if their members relied on insurance companies for it runs an economical service.

It is, therefore, hardly worth discussing the rationalisation of organisations in the cotton industry in terms of the economies which would be achieved. Rationalisation becomes important only if it can be expected to make a serious contribution towards the solution of the industry's major problems, only if it can help to surmount one or more of the obstacles which prevent, or are alleged to prevent, the replacement of the present cotton industry by a re-equipped and competitive industry. We propose to discuss its possible contribution in terms of two of these problems, which we call respectively the "labour problem" and "the problem of leadership."

It is frequently said by employers in the cotton industry that they have had to pay far too high a price for the agreement of the unions to co-operate in work study, in shift working and in re-equipment. The C.M.C. list, the Evershed list, and the Aronson list, were all agreed at a time of labour shortage when the unions had a bargaining advantage. Where the C.M.C. list was installed additional allowances were often made to smooth over its introduction. The additional cost of shift work (20% where the reduction of hours is from 45 to 37½, with an additional 20% for night work) is said to eat away almost the whole saving of shift work even on the most expensive equipment. Local negotiations on the manning of new machinery in both spinning and weaving is said to leave workers grossly under-loaded.

Even if these charges were substantiated it does not follow that changes in organisation would provide the remedy. It is often said, for example, that there is little point in preserving separate county negotiations for spinning and for weaving, since in recent years agreements on wage changes have almost invariably been for the same amount (in several instances as a result of a single decision of the recent Industrial Disputes Tribunal). Why should there not be one single negotiating procedure to settle wages for both sections ? On the trade union side this would require some formal agreement between the unions, or the concession of additional powers to the United Textile Factory Workers Association, or complete amalgamation.

It may well be that additional powers for the United Textile Factory Workers Association would be useful not only in rationalising county agreements, but also by promoting new services to cotton workers such, for example, as a research department, which no single union could support by itself. To be effective, however, these powers would have to be accompanied by a revision of the structure of the Association, and the appointment of full-time officers with executive authority. Moreover, there is little reason to suppose that a change of this kind would contribute much to the creation of an efficient and re-equipped industry. A number of major British unions have research departments without thereby becoming protagonists for every change which might increase productivity, and there is no reason to suppose that centralised negotiations would yield more to the employers than separate dealings for spinning and for weaving. It is just as likely that one section would hold back the other as push it forward.

The same argument applies with equal force to powers of the local associations in the cotton unions. Looking from the centre, the union leaders may think they could achieve much more if the local associations were placed in the position of branches in other unions to be instructed when they did not voluntarily comply with central wishes, but this is not necessarily so. If, for example, the Card Room Amalgamation had spoken with a single voice on such issues as work study, less might have been achieved than in fact has been.

Leadership

We propose to investigate the problem of leadership primarily from the employers' point of view, and it has several facets. There is, first of all, the argument that rationalisation would allow the industry to speak with a single, and hence more authoritative voice. It is suggested, for example, that a united front would have achieved more favourable decisions on the import of foreign cloth when, instead of reconciling their differences quickly, the sections bickered whilst advantages were lost. This argument, however, makes two assumptions. The first (which it is not our task to discuss) is that genuine opportunities have been lost through divisions. The second is that differences could be reconciled by rationalising the industry's organisations, and this must be pursued.

The rationalisation we are now considering is not the merging or abolition of the smaller and less effective associations, for they could not do much to undermine unanimity if the major organisations of the four horizontal sections of the industry could always agree on a common line of action. The problem is, therefore, to discover whether it is possible to create a single employers' association for the whole industry, overriding horizontal sectionalism.

A second part of the problem is provided by the post-war growth of vertical organisation in the industry, which has been seen as the most hopeful development of the period by those who take the view that the future of the industry will lie with the progressive vertical firm. This is not primarily for technical reasons, although we understand that modern methods of production give some advantage to the spinner-weaver; for the capable man who concentrates his attention on one stage of production can usually improve on the performance of the man who must supervise several stages. It is rather because the pursuit of the separate advantage of each stage neglects the advantage of the whole, and a series of compromises may give a better total result. If, as is sometimes said, the problem of the textile industry now is not to produce but to sell its output, the producer must be as interested in finishing and merchanting as in spinning and weaving. On these grounds it may be argued that the organisations of the cotton industry are ill-adapted to meet the needs of progress. Every horizontal firm has its representatives but no-one represents the vertical firm *as such*.

A third part of the problem is presented by local organisation. It is suggested that the federal structure of the employers' organisations makes it necessary for a man must play his part in dealing with the tedious details of minor local affairs in order to have a say in the decisions of the Federation of Master Cotton Spinners Associations or the Cotton Spinners and Manufacturers Association. Consequently it is said that the best men must either waste much of their valuable time (valuable to the industry as well as to themselves) or leave the leadership of the industry's organisations to others.

Single Association

A single unified employers' association covering the whole of the cotton industry appears to be the solution to all three parts of the problem. It would leave local matters to be dealt with by subordinate local branches directed from the centre; it would give direct representations to the interests of the vertical firm by representing the whole industry and leaving sectional affairs to subordinate departments at headquarters; and it would speak with a single voice on the industry's major problems. Such organisations exist in other industries, for example in steel and in chemicals. These industries have, however, a very different structure from that of cotton. In steel, for example, a very few firms produce the bulk of the industry's output. All of them cover a number of stages of production, and some of them all stages. A horizontal organisation based on independent local associations would make nonsense of such an industry. If it existed it would have to be abolished. But, with equal conviction, it could be claimed that the cotton industry's organisations must reflect the structure of their industry. In cotton the vertical firm is still the exception and the small firm is still the rule. Consequently there would be a great temptation for the majority of one section to pull out of a central organisation if it felt other interests were receiving more attention than its own. Although the number of firms has fallen considerably since the war the average size has increased only slightly in spinning and finishing, and not at all in weaving. So that (with the possible exception of spinning) it remains primarily an industry of small local firms which would not take kindly to a central organisation that overrode local interests.

This is not to say that the existing horizontal and localised structure has no defects. It is sometimes said that the industry is dominated by "backwoodsmen," and if by "backwoodsmen" is meant the small, local, horizontally-organised firm, this is true. But, since these firms form the majority, it is impossible to design a voluntary organisation which they would not be able to dominate. Wise decisions and unified decisions will only be taken if the "backwoodsmen" support them and are willing to comply with them. Consequently, anyone who wants to persuade industry into wise decisions must give his time to local affairs and to persuading the different sections to work together. Given the structure of the industry there is no short cut.

All this, however, refers to the past structure of the industry. It is more important to look forward to the shape it will have assumed when reorganisation is complete. The figures published by the special committee show that (taking into account the fact that there was probably some destocking taking place in April 1959) the number of looms and spindles left after scrapping will be about 75% of what is required to yield the present output of the industry with no increase in shift working. In spinning the scrapping seems to have affected large and small firms equally, but in weaving more seems to be due to the closure of small single-unit firms than to scrapping of looms by larger firms, so that there has been some concentration in this section. Because by and large they had re-equipped more than other firms the vertical undertakings appear to have scrapped less than their share, and will therefore become a larger section of the reduced industry. It thus seems a reasonable conclusion that when reorganisation is complete the horizontal and localised form of organisation will chafe a little more than they do now; but that the foundations for a single, centralised employers' association will still be far from complete.

Faced with successive stages of decline the Lancashire cotton industry has formed for itself a vision of a "rock bottom." This is an industry smaller than that which existed at any time in the last century, but smaller because it has shed its least efficient elements and rationalised the remainder, so that it has sloughed off its weaknesses and left a hard core with the competitive strength to meet any challenge. As a picture of what *must* ultimately happen, such a vision is, of course, misleading. There does not *have* to be any end to the industry's

decline so long as there is any industry left. Whatever the amount of redundant capacity liquidated in 1960, the industry may still be suffering from excess capacity in 1970. As a picture of what *might be*, however, the vision has much more to recommend it, but then it is a picture of what might be if men made it so. Then the vision requires to be translated into a design for reconstruction, and for that to be done there has to be far more agreement on the details than there is at the moment. Whatever the design, however, the structure of the industry must depend upon the character of its firms. The industry will be strong if they are strong; competitive if they are competitive. These characteristics cannot be imparted by the organisations of the industry by themselves. They can help, but no miracle of reorganisation can be achieved by imposing apparently ideal organisations on an industry with an unreformed structure. On the other hand, if the firms are reconstructed it will not take them long to create organisations to serve their purpose.

To a considerable extent an industry's organisations are a reflection of the structure of its firms. If the cotton industry sees confusion in the structure of its organisations, then it may be that this is a reflection of its own appearance. And if we do not like what our mirror shows us there is little to be gained by blaming the mirror.

What consequences follow from this analysis? We do not intend to be wholly pessimistic nor to suggest that nothing can be done to improve the industry's organisations. If it is true that there is a good deal of duplication amongst the cotton industry's organisations; if it is true that the cotton industry would achieve more by speaking with a single voice; and if it is true that the present horizontal and local organisations of the cotton industry does not adequately reflect all that is best in the industry (and we believe that a strong case can be made in support of each of these propositions); then several things can be done. First of all, the industry would do well to weed out any organisations which have little or no functions, for they cannot do much good and they can serve as a nuisance and an irritant. We would, however, suggest that the direct economies from rationalisation of this kind are closely limited. Secondly, the unions might well consider once more the possibility of transforming the United Textile Factory Workers Association into a powerful industrial federation. Thirdly, the Federation of Master Cotton Spinners Associations and the Cotton Spinners and Manufacturers Association might consider means of granting direct representation to their major firms. This is already an issue of some importance in the Federation and, if it is not yet urgent in the Association, it may in time become so.

Fourthly, it may be worth remarking that the drawbacks inherent in the proposal for a single cotton employers' association would not apply to a federal organisation of which the present horizontal organisations would be the constituents, on the model of the Wool Delegation. Such an organisation would have several advantages. It could bring together all the organisations of the industry, including those not now represented on the Cotton Board, such as the Condenser and Allied Spinners and Manufacturers and the Cotton Yarn Doublers' Association (if they maintain a separate existence). If it was thought desirable it could embrace also the Liverpool and Manchester Cotton Associations and the Rayon Producers, as did the first Cotton Board. In addition it would provide pressure for employers to reach an agreed view at an earlier stage than is possible at the moment, without enforcing uniformity and thus running the risk of secession. It could do this all the more because it would be the creation of the industry, and therefore not suspect, as the Cotton Board is in some eyes of being a "creature of the government."

Alongside these advantages, there would be problems. The relations between this "Cotton Delegation" and the Cotton Board would need to be defined. A possible demarcation would be to confine the Board to statutory functions, leaving matters which could be voluntarily settled to the federal body. Besides that, the Cotton Board would probably be unable to act when the federal body had agreed to drop an issue; in the past such an obstacle might have prevented the Board from exercising initiative as it has done. These are serious objections. All we would suggest is that, if there is need for some overall form of organisation, this proposal is not incompatible with the present structure of the industry.

Export Opportunities

Cape Province:
Dress and Furnishing Fabrics

Mr. F. W. Mueller, P.O. Box 1831, Cape Town, would like to represent U.K. manufacturers of dress and furnishing fabrics in contemporary designs. Manufacturers interested should write direct, also notify the U.K. Trade Commissioner, P.O. Box 1346, Phoenix Building, 42 Burg Street, Cape Town.

Jordan:
Khaki Drill and Piece Goods

Haik Peltekian and Son, Wadi Essir Road, Amman, want to get in touch with U.K. manufacturers of good quality khaki drill, other materials suitable for services' clothing. They are an old-established concern, and manufacturers interested should write direct, also notify the Commercial Secretariat, British Embassy, P.O. Box 87, Amman.

Syria:
Rayon and Nylon Yarn

Mr. J. Arbagi, 56 Harika - Maamoun Street, Damascus, wants to contact U.K. suppliers of rayon and nylon yarn. Established in 1952, he is a merchant and commission agent. Suppliers interested should write direct, also notify the Commercial Secretariat, British Embassy, Rue Phenicie, Beirut, Lebanon.

Kenya:
Textile Machinery and Dyed Yarn

Kenya Knitting and Weaving Works, P.O. Box 780, Nairobi, would like to receive quotations from U.K. firms for 15 automatic looms, a winding frame of about 30 spindles and 1 warping machine. In addition they would like to receive quotations for dyed yarn. It is estimated the firm will require 15,000 lbs. yarn and 25,000 lbs. cotton yarn per month, comprising dyed single yarns of count 6s for towels, 10s for bedspreads and table cloths, and 20s and 30s for furnishing fabrics. Firms interested should write direct, also notify the U.K. Trade Commissioner, P.O. Box 30133, Memorial Hall, Delamere Avenue, Nairobi, Kenya Colony.

Western Germany:
Woollen and Worsted Suitings

The firm of Richard Haupt, Heugelstrasse 74, Frankfurt-am-Main, would like to represent U.K. manufacturers of medium-priced woollen and worsted suitings. Established in 1889, they already have agencies for the textile trade and manufacturers interested should write direct, also notify the British Consulate-General, Zeppelinalle 47, Frankfurt.

Western Germany:
Cotton and Synthetic Yarn

Hermann Fink, Kaulbachstr. 16, Munich 22, would like offers from U.K. manufacturers of cotton and synthetic yarn for bandage material. It is a sole proprietary business founded in 1937, and engaged in the manufacture of bandages. Manufacturers interested should write direct, also notify the British Consulate-General, Akademiestrasse 7 - 9, Munich.

How Cotton Fibre Structure Affects Bleaching and Dyeing

The increased reactivity of mercerised compared to unmercerised cotton is probably due to the wider interplanar spacings of the unit cell, which allow water molecules to enter more easily

By PROFESSOR K. S. CAMPBELL*

THE reactions of cotton fibre to chemical treatment are in part determined by physical characteristics. Cellulose is a macromolecule made up of anhydro-glucose units united by 1·4 oxygen bridges. The anhydro-glucose units are linked together as in beta-colloboise; so the anhydro-beta celloboise is the repeating unit of the polymer chain. Chain length and the way the chains are arranged in respect to each other determine many important fibre properties. Native cotton is made up of chains of molecules consisting of about 3,500 anhydro-glucose units. The molecular weight is approximately 570,000, figured on the number of units (3,500) times the molecular weight of each unit (162).

Cellulose is a strong fibre because its macromolecules are long, and there are great possibilities of action between the many cohesive forces of neighbouring chains. The principle force binding the macromolecules together is the hydrogen bond, a form of secondary valence that exists between the hydroxyl groups of glucose molecules in adjacent chains. The strong bonds produce a fibre highly insoluble in water and many other solvents.

Checking Fibre Damage

Cotton fibre can be dissolved by immersion in cuprammonium hydroxide or cupriethylene diamine. These substances break the hydrogen bonds and introduce ionic groups that speed up solubilisation. The extent to which cotton may have been damaged by some form of chemical treatment can be determined by dissolving samples in either cuprammonium hydroxide or cupri-ethylene diamine. Normal cotton dissolves in these solutions to produce a liquid of a certain viscosity. An equal weight of degraded cotton will produce a solution of lower viscosity because some of the hydrogen bonds were destroyed in processing. Analytical procedures based on this phenomena are very useful in determining the extent of degradation of the fibre at any stage of processing.

* *Department of Textile Chemistry, State College of Textiles, N.C., U.S.A.*

X-Rays Peg Fibre Structure

It was formerly believed that textile fibres were practically 100% amorphous. But if X-rays of a wave-length of 1·54 A.U. are passed through cotton fibres they will form diffraction patterns on a photographic plate that prove the presence of crystalline structures. X-ray examination of this sort shows that cotton contains great numbers of submicroscopic crystals or crystallites laid out along the fibre axis. Furthermore, these crystillites lie in spiral paths about the fibre axis, and the spiral angle can be calculated from the diffraction pattern. The pattern also tells something about the degree of crystallinity and the extent to which the crystallites are arranged in parallel order. This information helps to predict the properties of a given fibre and explain the effect of a given chemical treatment.

Crystallites Occur at Random

Crystallites are thin bundles of chain molecules also called miscelles. They are not discrete areas in themselves. Individual chains may pass through crystallites and thereby connect them. When the crystallite areas are in sufficiently perfect three-dimensional order, the total area is said to be in the crystalline state.

But crystallite areas are often interspersed with areas in which the chains are too far apart or not well enough oriented to form a crystal lattice. These are the amorphous regions that in a sense hold the crystallites together. Crystallites do not appear with any degree of regularity and vary in size; but they have been determined to be from 150 to 1,500 A.U. in length and 50 A.U. in width, as shown in Table 1.

Table 1

	Length (A.U.)	Width (A.U.)
Cotton fibre	44×10^3	2×10^3 (20 microns)
Cotton-fibre lumen ..	4×10^3	1×10^4 by 10×10^4
Cotton-fibre primary wall, including cuticle	4×10^3	1×10^3
Cotton-fibre secondary wall, including winding	4×10^3	5×10^1
Crystallites	150 - 1,500	50
Cellulose chains ..	18,000	3×8
Unit cell of crystallite	10·3	$7{\cdot}9 \times 8{\cdot}35$
Cellobiose unit ..	10·3	3×8
Glucose anhydride unit	5·15	3×8
Water molecule by comparison ..	3	3·3

° A.U. = angstom unit or 1×10^{-8} cm.
1 micron = 0·001 cm. = 10,000 A. = 10^4 A.U.
1 micron $\simeq \frac{1}{25{,}000}$ in.

Microscope Reveals Fibrils

The next building block in the cotton fibre is the fibril. Under an optical microscope, it appears to be a single fibre about one micron in diameter. The electron microscope reveals that fibrils are composed of several dozen strands. Fibrils are laid down in spiral fashion as the fibre grows at various angles. The smaller the angle is in respect to fibre axis, the stronger the fibre.

The degree of crystallinity in the cotton fibre has considerable effect on how it will react to various reagents in processing. The crystalline areas are practically impenetrable to most reagents except those that will destroy cellulose. The spaces between crystalline areas, which are hydrogen-bonded, are so close together that they will not even admit a water molecule of 3 A.U. dia. If the crystalline-amorphous area ratio is known, some insight is gained as to how the fibre will behave in processing.

Structure Varies Widely

Amorphous areas and the surfaces of the crystalline areas are considered to be accessible to reagents. The amorphous content of native cotton varies widely from 1 to 40%. The crystalline areas of untreated cotton are accepted as being from 80 to 90% of the total fibre. Mercerisation reduces crystallinity to about 70%, but this reduction is not a result of destruction of the very durable crystallites. Actually, the crystalline areas persist as such even after the fibre has been reduced to a powder by treatment in hydrochloric acid.

Cellulose may crystallize in several forms. Natural cellulose is known as Cellulose 1, while the type called Cellulose 2 is characteristic of mercerised cotton. The X-ray patterns formed by each are quite different and serve to distinguish one from the other. The increased reactivity of mercerised cotton compared to unmercerised cotton is probably due to the wider interplanar spacings of the unit cell, which allow water molecules to enter more easily.

Orientation v. Crystallinity

Although the molecules or portions of molecules within a crystal are ordered and aligned, or oriented, this alignment is not what is usually meant by orientation. The crystallites themselves may be arranged within the fibre, either in an order or random fashion, parallel to the fibre axis. This situation is called crystallite orientation and is the most usual meaning of the term orientation.

If a fibre is stretched, the crystalline regions and neighbouring amorphous areas are often more regularly aligned. There is no correlation between extent of orientation and degree of crystallinity. A very highly oriented fibre may have low crystallinity and conversely.

The amorphous regions of the cotton fibre are considered to be the only areas that can be penetrated by water or aqueous solutions. In an average cotton fibre, these open spaces occupy 30 to 40% of the total volume of fibre. The efficiency of a processing treatment of cotton is determined largely by the intermolecular, intermicellar, and interfibrillar spaces because the entry and diffusion of any liquid agent applied will be governed by their number and their arrangement.

Simple Basic Rules

The two important limiting factors that apply to the everyday problems of the processor are the size of the molecule and the substance he wishes to apply and the size and distribution of the pores or open spaces in the fibre to be treated. Water is the most frequently used solvent for fibre-processing chemicals; so the size of the water molecule usually determines the initial penetration of water-borne chemicals or dyes into any fibre.

It is generally agreed that water cannot penetrate the crystalline cellulose lattice; but it can enter the amorphous, or open, areas readily and break the relative weak links between these less-ordered chain molecules. The water pushed these molecules and the crystallites farther apart, making it easier for larger molecules to penetrate the fibre. The water swells the fibre until the swelling force is balanced by the elastic forces set up by the deformation of the fibre.

Much work has been done by many investigators to develop this theory further and to find out the exact mechanisms involved when a fibre is treated with water or water solutions of dyes and chemicals. To date, in spite of these investigations, we know little of the true nature of the pores in fibres

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High Temperature Fibres, Felts of Pure Graphite*

GRAPHITE textiles, in almost any form desired—fibre, yarn, braids, felts or woven fabrics—can now be produced as a result of recent developments in this field. Fibres in such textiles are 99·9% pure graphite. Their crystalline structure is similar to that of conventional manufactured graphite. Thus the flexibility of textiles is now coupled with the high temperature strength, chemical inertness, high electrical and thermal conductivity, and self-lubricating characteristics of graphite.

The starting material for the graphite textile is a man-made fibre, such as rayon. Graphite fibres can be produced directly from the rayon fibre, or the fibre can be twisted, felted or woven, before graphitising, into the end textile form desired. The organic fibre or fabric is then processed at temperatures of the order of 3,000°C. to graphitise the fibre and form the finished graphite textile.

Graphite fibres have the same basic properties as conventional manufactured graphite. Individual graphite yarns have shown tensile strengths as high as 15,000 lbs./sq. in. Properties of fabrics, of course, depend on the type of fibre and weave. Like conventional graphite, graphite fibres increase in strength with temperature up to a maximum at about 2,500°C. At about 200°C. and higher, the material must be protected from oxidation. Graphite does not melt, but sublimes at about 3,700°C. It is unaffected by low temperatures, consequently, graphite fabrics are as flexible at the 195·5°C. temperature of liquid nitrogen as they are at room temperature.

Graphite is extremely resistant to thermal shock because of its low thermal expansion and high thermal conductivity. It has good electrical conductivity, good nuclear moderating properties, and a low neutron-capture cross section. It is resistant to practically all acids, alkalies, and organic compounds, except those that are highly oxidising.

One of the most promising uses for graphite fabrics is as a reinforcing material for plastics, ceramics or refractories for high temperature applications, such as rocket nozzles and nose cones. Potential chemical uses include bag-type filters for hot non-oxidising gases; components for handling corrosive fluids; electrostatic precipitators; high temperature curtains walls; and flame arresters. Electrical applications may include resistance heating elements, both for industrial high temperature use and for low temperature space heating. Electrical connectors can be provided by metal plating, spraying or vacuum deposition.

* *From "Materials in Design Engineering," May*, 1959; 149.

TEXTILE MACHINERY and MILL EQUIPMENT NEWS

Features of Tyre Cord Doubling Frame

Constructional features of a machine designed to produce cabled tyre cord in one operation. Ring sizes can be made to suit requirements, the standard machine having 7-in. ring and 9½-in. lift. Three different driving methods are available

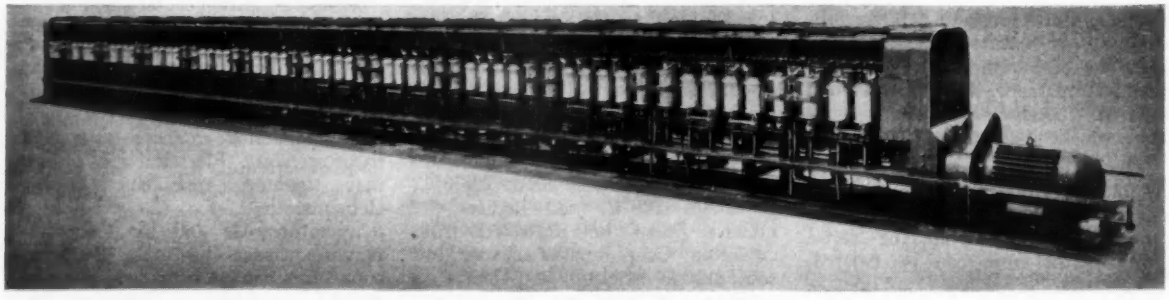
BUILT on a much stronger pattern than the ordinary ring doubler, all the gearing in the Aruncorder tyre cord doubling frame—including worm wheel and worm—is machine cut from the solid, and gears have shanks running in long cast iron bearings with forced oil lubrication. Amongst many other features, the spindle rails are deep section, double girder type, accurately machined on the upper flanges to provide a true fitting bed for the spindles of a specially heavy type; these are capable of very steady running when carrying a full bobbin at high speeds. Designed to produce tyre cord of cabled yarn at one operation by the uptwist and downtwist method, the uptwister spindles are arranged with counter bored top to carry a patented friction controlled spinning cap and flyer to give the correct tension to the uptwisted yarn.

The machine can be operated at a high efficiency with small labour force and a minimum amount of waste. The ring sizes can be made to suit requirements but a standard machine with 7 ins. ring and 9½ ins. lift will hold about 9 lbs. of cable yarn—approximately the weight of rayon yarn from two spinners' bobbins. Wick feed, with patented feed to oil reservoir, ensures an oil film on the rings when running. Very wide, deep section ring-rails give the necessary stability during running. The lifting pokers of ample diameter work in long cast-iron bearings and an arrangement is also applied to steady the rails at all parts of the lift.

Three methods of driving are available: (*a*) by belt from lineshaft, (*b*) electric motor on special bedplate and V-ropes or (*c*) motor over headstock and V-ropes. The delivery rollers are polished iron, two lines of bottom and one line of top for doubling rings only. The small diameter top roller prevents any tendency of the yarn to pull through and thereby reduces the amount of irregular twist. Fitted behind the rollers on a steel traverse rail carried by self-lubricated bearings, are glass guides which traverse up to ⅜ in. to prevent the yarn cutting a groove in the rollers. Connected to rear delivery rollers is an electric tell-tale control which lights a lamp at the gearing end when an end fails or runs out on the uptwister bobbins. A combined measuring and electric knock-off motion will stop the frame at any pre-determined length for one-, two- or three-shift working. Arundel, Coulthard and Co. Ltd., Stockport and Preston, will gladly supply full particulars of the machine on request.

Dyeing Glass Fabrics

A NEW process announced by Union Carbide International Company, U.S.A., for dyeing glass fibre fabrics used mainly for furnishings, etc., involves the use of chemically reactive silicone that tenaciously ties the dye to the glass fibre. The new process—Silrama—permits the use of fourteen different classes of dyes, and makes possible, in presently used "Coronizing" lines, the production of fabrics with a whole host of new colours. It is claimed that Silrama treated fabrics can be washed repeatedly in either soaps or detergents without suffering visible reduction in original colour intensity, also that the light fastness of treated fabrics is equal to the maximum obtainable with any particular dye class. Fadeometer exposures of 200 hours show now shade change for many colours. In addition to light and wash fastness, the process imparts solvent resistance to the treated fabrics. If desirable, spots may be removed with commonly used cleaning fluids. With the Silrama process, it is possible to use the full range of shades available in many different dye classes.

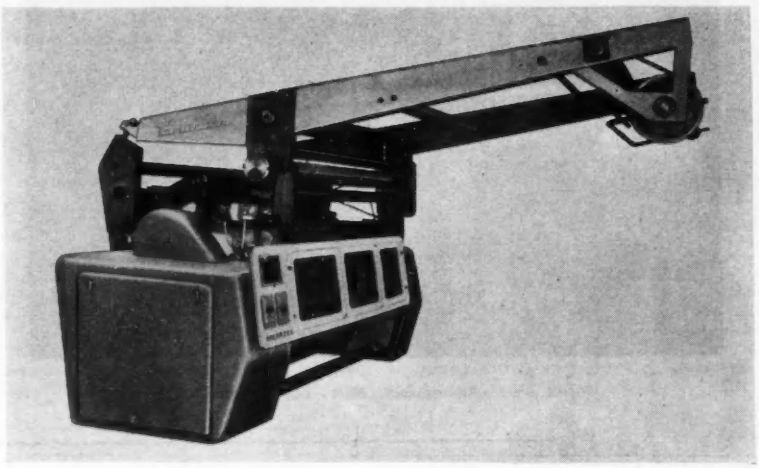


Aruncorder tyre cord machine designed and made by Arundel Coulthard and Co. Ltd.

Improving Safety with Reinforced Plastic Guards

A NEW development in machinery design and construction is the introduction of reinforced resin machine guards based on Bakelite polyester resins, by Tomlinsons (Rochdale) Ltd., well known as manufacturers of Auto Zero raising machines. These guards have been designed to modernise and improve the overall appearance and finish of the machinery and, by virtue of the excellent weight/strength ratio and shock-absorbing properties to offer a much improved degree of industrial safety.

A number of important additional advantages are claimed for the new Tomlinson guards. They are only one-third as heavy as more conventional sheet metal guards and therefore easily fixed in position; can be made without incurring heavy expenditure on tooling; are quickly and inexpensively repaired in-situ and easily modified or tailored to fit awkward corners or sections of machine-shop floors. The guards are also highly resistant to corrosion. In the latest 36/AZ Auto Zero raising machine, over 650 sq. ft. of the new guards, all made from glass-fibre reinforced Bakelite polyester resin, have been installed. The manufacturer reports that the improved finish, appearance and safety features resulting from the use of reinforced resin has aroused considerable interest.



A Tomlinson raising machine fitted with guards made from glass-fibre reinforced bakelite polyester resin

Dexion in the Clothing Industry

A PROMINENT Italian textile concern—Texa of Milan—is using Dexion slotted angle for racks, benches, partitions, supports and other equipment in its ultra-modern factory. Texa, makers of clothing for men, women and children, were so pleased with the installation job done by Dexion Ltd.'s distributors in Italy—F.I.M.—that they awarded them a special gold medal. The factory, covering 150,000 sq. ft., produces over 10,000 pieces of varied clothing a day.

Texa is well known in Italy, although founded only three years ago. Much of its output is exported. The firm discovered how useful Dexion could be in textile production from Contex, at Borgomanero, one of the most important cotton mills in Italy, which uses it extensively. The versatility of Dexion makes it widely used in the textile field. If requirements change, it is easily dismantled and re-erected elsewhere.

One department of the modern clothing factory of Texa, Milan, where Dexion has been used for benches, racks, cutting-out tables, partitions, etc.

New Turntable Truck

WITH all the developments there are in powered trucks of one sort or another there still is room for the plain and ordinary hand pushed or pulled platform truck. F. Piper and Sons Ltd., 62 - 70 Elmington Road, London, S.E.5, with their "Mobility" range, have introduced a robust and useful "turntable" type truck known as the TTT/10, No. 1. Of 1¼ ins. dia. tubular steel construction with a wood platform having sides and corners bound with 16-gauge angle, a top area of 36 × 24 ins. and a height of 13 ins. from the ground, it is fitted with 10 ins. dia. wheels with roller bearings on a 1 in. axle. It can be supplied with either cast-iron, rubber tyred, or pneumatic tyred wheels. With pneumatic tyred wheels it weighs 106 lbs. and has a carrying capacity of 20 cwts.

Chain Grate Ash Extractor

Chain grate ash extractor. (Riley I.C.) Products Ltd.)

THE automatic, conveyor type, ash extractor recently introduced by Riley (IC) Products Ltd., 19 Woburn Place, London, W.C.1, is designed to ensure very limited wear on the moving parts, since the ash is stationary on the apron plates and moves in relation to the conveyor. The conveyor travels at a constant speed of 3¼ in./min. and is driven by a separate gear assembly comprising an ¼ h.p. geared motor with a reduction of 1,440/0·96 r.p.m. and a further gear train with a 3 to 1 reduction, giving a front shaft speed of 0·32 r.p.m. A spring-loaded clutch with the driven half on a splined shaft protects the gear assembly from overload. Provision is made for tensioning the conveyor.

A steam cleaning assembly, operated for about 15 secs. per week, removes any fine particles of ash which penetrate to the inside of the extractor. The ash box at the front of the stoker provides for an ash chute to a water trough conveyor, but it can be fitted with a draw-plate for discharging ash into a low trolley or pan with runners attached. The automatic ash extractor eliminates the opening of ash doors. Forced draught fans do not have to be stopped while ashing is in progress and there is, of course, a saving in labour.

Unit Construction Timber Partitioning

UNIT constructed office timber partitioning made by Farrow and Jackson Ltd., 41 - 2 Prescot Street, London, E.1, is supplied in standard size components for quick and easy site erection.

The component parts consist of interchangeable solid and/or glazing panels, machined posts and rails, all interchangeable to form rigid screens, by a unique system of grooving and housing. Because of the unit form all panels, whether solid or glazed, can be interchanged without the partitition screen being dismantled, a great boon where it is found necessary to make a change.

Standard accessories include 6 ft. 6 ins. high by 2 ft. 6 ins. wide sliding and side hung doors. Side hung doors incorporate built-in mortice locks and lever furniture and sliding doors slide on easy-running door track. Other accessories are made to order.

There are three distinct types of finish: the commercial grade, Type 1, consisting of framing posts, rails, etc., in good joinery quality softwood with solid panels in hardboard faced both sides. All are finished primed before despatch. The commercial grade, Type 2, has framing posts, rails, etc., in imported softwood with "Vynalast" plastic covering or with an alternative hardwood with cellulose polish finish. The executive grade has framing posts, rails, etc., in hardwood with cellulose polish finish, the solid panels being faced each side with "Warerite" wall board.

Farrow and Jackson unit constructed office timber partitioning

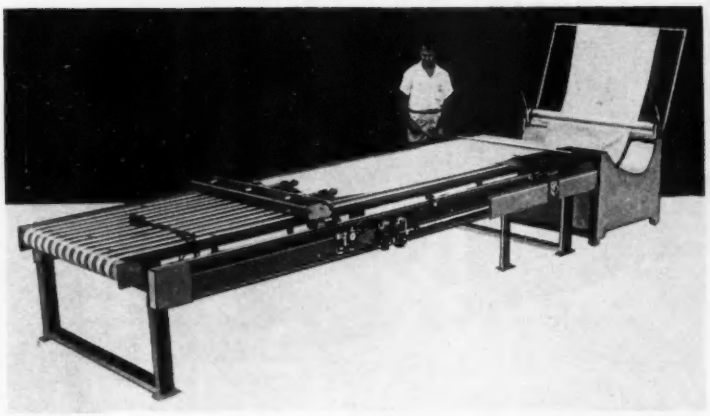
Warehousing Wool Yarn Simplified

DIFFICULTIES in reaching baskets of yarn skips piled on one another at the Long Eaton, Derbyshire, warehouse of Cox Moore Ltd., knitwear manufacturers, have been solved by the use of Dexion slotted angle. Now their "pigeon-hole" unit of Dexion racking gives easy selectivity to over 200,000 lbs. of wool yarn.

The storage bays in the Dexion racking system, each 6 ft. 3 ins. high by 10 ft. 6 ins. wide, hold baskets of wool yarn weighing about 150 lbs. If the firm decides to redesign the layout of the stores, the Dexion can be dismantled and re-used.

Dexion racks

Cutting Curtains



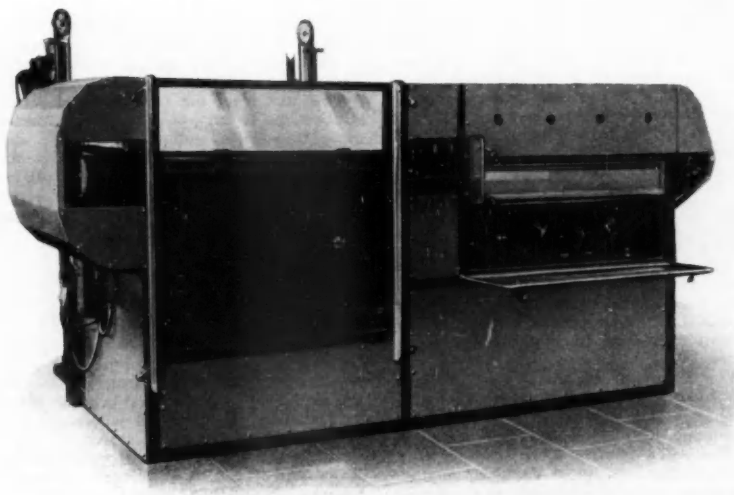
AN automatic cutting table for curtains and draperies is announced by Sjöström Machine Co., Boca Raton, Florida, U.S.A. The machine consists of a scray with power-driven nip-rolls, cutting table, adjustable tension bar, conveyor belts and electronic controls. The feed rolls on the scray are set for the length to be cut—mechanical fingers grip the front edge of the material and pull it past the operator to the exact length required—the operator stands in one position and cuts only. Lengths can be set from 36 to 120 ins. and the standard machine handles material up to 48 ins. wide.

After the operator makes the cut, the curtain is carried away on conveyor belts, while the next curtain is being pulled forward from the scray which has already fed in a curtain length from the box or roll. Thus the operator does not move from her position. From 2 to 3 secs. is required to pull a 120 ins. curtain past the operator, so if the operator makes the cut in 2 secs.—a production of 12 to 16/min. is feasible. Material with a bias as much as 4 ins. is taken care of by elongated fingers farthest from the operator. For handling cut-outs or matched panels, the operator makes the first cut, then positions the material manually for the next cut 2 to 3 ins. apart. For drapery materials the machine is equipped with a stacker which stacks the cut panels over a bar or table.

New Continuous Conditioning Machine

OCCUPYING only 11 ft. by 6 ft. 9 ins. in floorspace the latest Geisler yarn conditioning machine (Model H.M.C.3), marketed in this country by Textile Machinery (Manchester) Ltd., Thorley Street Works, Failsworth, Manchester, will handle and efficiently condition cops, pirns, ring- and doubling-frame bobbins in addition to cross-wound types and hanks, etc. Conditioning is effected by means of eight swivelling upper atomisers and eight fixed atomisers, working at 35 p.s.i. pressure, positioned at the sides of the lattice conveyor. These spray the atomised conditioning solution from top to bottom and bottom to top through the conveyor constructed of close mesh stainless steel.

The conditioning solution is prepared in a brass vessel of approximately 65 galls. capacity situated beneath the lattice and mounted on rollers to facilitate withdrawal for cleaning and filling. The solution is constantly stirred and pumped to the atomisers, and that not absorbed by the bobbins, yarns, etc., is recovered after passing through a double filter.

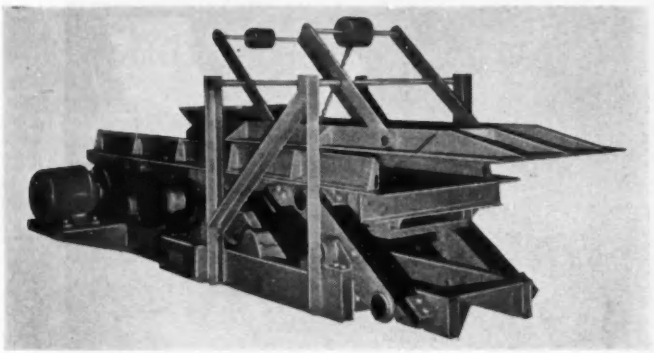


Unloading the full skips or cases is performed automatically. An elevator driven by a ¾ h.p. motor will accommodate all sizes of skips or cases up to 110 lbs. capacity at one lift. Where extra large skips are in use, the hoisting arrangement can be made so that the skip can be emptied on to the moving belt in three stages, thereby spreading the load. The bobbins, etc., are first emptied on to a slow travelling apron which carries them on to a second stainless steel apron of higher speed which takes them under the conditioning apparatus. Full control of the amount of moisture applied is achieved quite easily by varying the speed of the metal apron and/or by the number of sprayers in use. All driving parts such as speed regulator, pump, motor, etc., are completely protected inside with movable panel offering easy access.

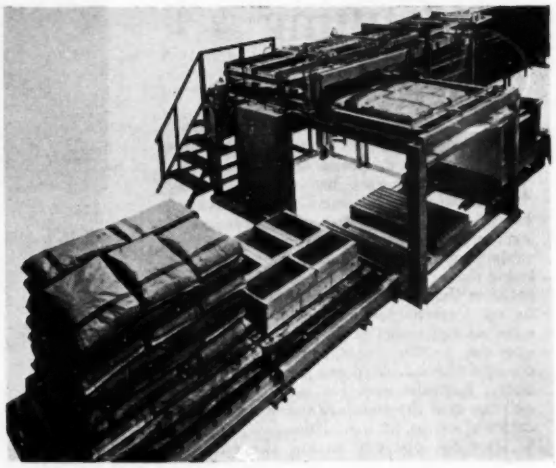
Depending on the capacity of the skips used, a production of 5,000 ring bobbins per hour is claimed for the machine.

Durable Crease Finish

Proban Ltd. announce that three more finishers have signed agreements for the use of the "Immacula" finish on wool fabrics. This, the second group of licensees to be announced, includes Thomas Birkhead and Son (Lee Mills, Scholes, Holmfirth), J. E. Bentley and Co. Ltd. (Woodfield Mill, Greetland), Hopkinson and Shore Ltd. (Royd Mills, Brighouse). The "Immacula" finish demonstrated to the trade in July, is a finish applied by the cloth finisher and not by the maker-up. Only at the final pressing is the latent chemical change giving crease retention brought about, and this calls for no use of chemicals by the tailor himself.



The Western Vibro-Flattener is normally used in conjunction with the pallet loader when handling sacks. It can also be used independently on any bag or sack production line



The "Western" fully automatic pallet loader handles pallets or boxes with equal precision

Automatic Pallet Loading

A RANGE of fully automatic pallet loading machines are now being produced by Western Manufacturing (Reading) Ltd. The pallet loading machine is capable of handling bags, sacks, crates or cartons with equal ease, in fact, any product normally palletised. The speed of the machine is easily adjusted to suit a variable production rate and is fully automatic. It requires no special operator and can be supervised by the fork-lift truck operator who would attend to the removal of loaded pallets.

The machine takes charge of the sacks or containers direct from the production line, it then uniformly arranges it into any desired pattern on the pallet. The process is continuous until the pallet is fully loaded. When the pallet loading machine is handling bags or sacks, these are passed through a vibro-flattening unit prior to the loader, thereby ensuring uniformity. Associated equipment such as the vibro-flattener, powered roller conveyors and empty pallet dispenser, etc., can be obtained and individually fitted to existing systems, if desired.

The Type 1211 Stroboscope has been transistorised, eliminating the need for heater current to the valve cathodes

New Battery-Operated Stroboscope

A NEW stroboscope, the Type 1211 Stroboscope, developed by Dawe Instruments Ltd., 99 Uxbridge Road, London, W.5, is powered by a battery. It is a portable unit capable of being operated anywhere without the need for plugging in to the mains, the normal thermionic valves having been replaced by transistors, thus eliminating the need for heater current to the valve cathodes. The size of the Stroboscope is $5\frac{1}{4} \times 3\frac{1}{2} \times 7\frac{5}{8}$ ins. and it weighs less than 4 lbs., so that it can be held easily in one hand. The 12 volt supply needed for the transistors can be provided either from a small battery pack, such as that illustrated, or from any 12 volt d.c. source capable of supplying a current of 1 amp. (for instance a vehicle battery).

The transistorised circuits enable the stroboscope to be run for approximately 8 hours from a fully charged battery measuring $9\frac{1}{2} \times 5\frac{1}{2} \times 4$ ins. and weighing $9\frac{3}{4}$ lbs. The control knob on the front panel of the instrument enables the flash rate to be adjusted accurately to any figure between 600 and 15,000 per minute. The flash duration of the neon-filled stroboscope lamp is only 15 millionth of a second, which ensures sharp images at all speeds. The selected flash rate is indicated directly by the meter on the control panel. The stroboscope is enclosed in a robust metal cabinet provided with a handle. It will undoubtedly find its application wherever mains supplies are not available, but will be equally useful in workshops where large machines are studied, or where points of observation are awkwardly placed.

Western Germany:
Chintz and Similar Fabrics

Mr. H. J. Montag, 39d Emser-strasse, Berlin W.15, would like to represent U.K. manufacturers of chintz furnishing fabrics and similar material. He has been an agent for a number of years and sells to wholesalers and departmental stores. Manufacturers interested should write direct, also notify the Commercial Section, British Consulate-General, Charlottenburg 2, Uhlandstrasse 7 - 8, Berlin.

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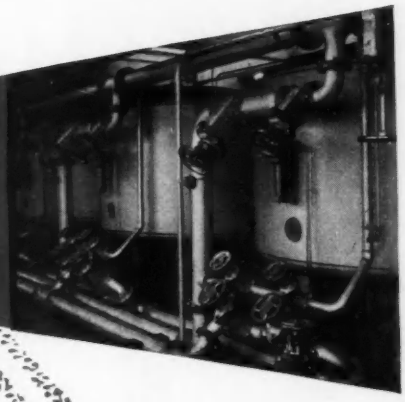

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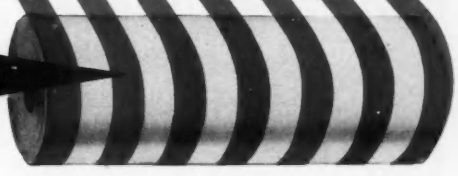

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Progress in Dyeing and Finishing

Details of a new staining test particularly useful on viscose rayon fibres, also some recent developments in anti-static treatments and wool dyeing techniques. Recent patents cover production of seersucker and high lustre effects and dyeing polyester fibre goods

By B. C. M. DORSET

A NEW type of staining test devised by Kato in Japan (J. Text. Research, 1959, **29**, 661) allows accurate differentiation of the skin and core of viscose rayon fibres, also of mercerised and non-mercerised cotton fibres. Considerable importance attaches to the skin-core structure of cellulose fibres since, in general, their physical properties and technical value depend profoundly on whether or not the ratio of skin to core is high. With a high ratio, the fibre usually has a much higher strength accompanied by reduced extensibility and these properties are desirable in the manufacture of cords for reinforcing tyres and industrial belting. Manufacturers of viscose rayon have in recent years discovered how the rayon spinning process can be conducted to produce fibres having a controlled ratio of skin to core.

The earlier staining test devised by Kato (J. Text. Research, 1957, **27**, 803) involves preliminary preparation of fibre cross-sections 5μ thick embedded in paraffin and fixed to the microscope slide by the usual albumin adhesive. Such a slide preparation is then heated in a solution containing 1% of the direct cotton dye Azine Brilliant Blue (Colour Index No. 512 or 518) and 10% of sodium chloride over a water bath kept at the boil for about 30 mins. The slide is then rinsed with cold water and thereafter repeatedly washed with 60% aqueous alcohol. In this way dye is steadily removed by the fibre sections but to a less degree from the skin than the core of the fibre, so that ultimately this differential dye diffusion from the two parts of the fibre reaches a stage where by microscopic observation the more deeply coloured skin can be clearly distinguished from the core. The appearance of a stained rayon tyre cord is shown in Fig. 1*a*, and Fig. 1*b* is the staining of another type of tyre cord having a much thicker skin.

In this earlier method the differential staining of skin and core can be explained as arising from a difference in the diffusion rates of the direct cotton dye within the skin and the core celluloses. In the new test which makes use of the *reactive* type of dye, particularly Procion Black HGS, the distinction between skin and core depends more on a difference in the degrees of chemical combination between the skin and core celluloses, for it is now known that Procion dyes combine with the hydroxyl groups in cellulose fibres.

The staining solution is prepared by dissolving 10 grams of Procion Black HGS and 7 grams of urea in a small amount of hot distilled water. After cooling, 2 grams of soda ash is added and the solution diluted to 100 c.c. Such a solution is stable and at room temperature can be stored for several weeks without appreciable deterioration. In the staining test the glass microscope slide is prepared with the usual 5μ thick fibre cross-sections, then flooded with the staining solution; it is next heated on a hot plate for several minutes taking care to avoid drying. Thereafter the slide and coloured cross-sections are rinsed with water and mounted ready for microscopic examination in the usual manner.

In such a staining test the black Procion dye combines only with the cellulose in the skin area but to ensure this it is necessary to prepare the staining solution in the manner described and with soda ash, *not with any other alkali such as sodium bicarbonate or sodium triphosphate*—the former is too weak so that sufficient staining does not take place while the latter is too strong so that the staining is too strong to make a differentiation between skin and core satisfactory. Heat is necessary to promote staining since dye fixation in the skin does not occur in the cold. On the other hand, if the heating is continued to dryness the core also becomes stained to a degree such that the skin cannot be so readily distinguished from the core.

This new test can obviously be of considerable importance to those concerned with the production and use of viscose rayon fibres under circumstances where it is necessary that the fibre structure shall be known or controlled but it has been noted by Kato that wool fibres by a similar staining procedure can have their bi-lateral structure revealed in much the same way as by the earlier staining test of Horio and Kondo (J. Text. Research, 1953, **23**, 373). Although nylon is resistant to staining by this new Kato test it does stain after ultraviolet irradiation.

Anti-static Treatments

A large number of products have been discovered in recent years suitable for application to polyamide and

Fig. 1 (A and B). Cross sections of rayon motor tyre cord fibres stained by the Kato method showing fibres having (A) skin and core and (B) all skin

polyester fibre goods such as those made from nylon and "Terylene" to reduce their normal tendency to accumulate high electrostatic charges during carding, spinning, weaving, and knitting, etc. operations. Many are very effective but it has often been found that the coating applied tends to rub off where the fibres (or yarns or fabrics made from them) are moved in contact with the machinery employed thus making the fibres again capable of becoming highly charged with static, and this unevenly. According to B.P. 817,355 it is possible to avoid this by arranging that the anti-static agent has such a chemical composition that it remains liquid below 30°C. and thus does not "cake" on the surfaces of the fibres in such a manner as to rub off easily. This type of anti-static agent is made by condensing one to three moles of a fatty acid with one mole of glycerine previously condensed with from 3 to 40 moles of ethylene oxide. The fatty acids most satisfactorily used are oleic, stearic, and lauric acids. Fig. 2 shows the probable reactions involved in such a synthetic process.

A typical product is thus made by condensing one mole of glycerine with six moles of ethylene oxide and then reacting the resulting condensation product with one mole of lauric acid. Alternatively the glycerine may be condensed with say 24 or 12 moles of ethylene oxide. In applying such a product to nylon or "Terylene" materials it is generally advisable to use a spraying or padding method to ensure that 0·05 to 1% is ultimately dried into the material. An American method to measure the anti-static effect of such products involves rubbing the treated fabric against botany wool serge fabric and then measuring the charge generated in terms of the electric current which then passes in a peak voltmeter circuit (Amer. Dye. Rep., 1951, **40**, 164) under standard

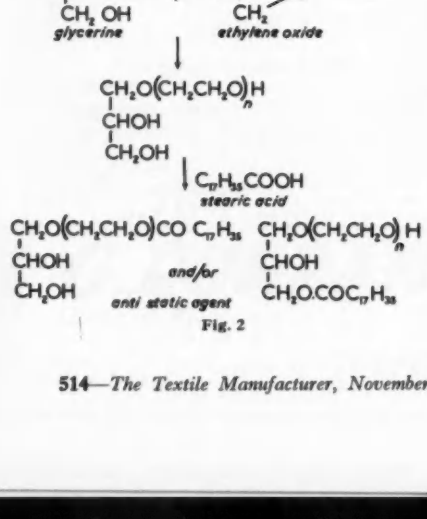

Fig. 2

humidity and other conditions. The data in Table 1 obtained with some of the anti-static products described clearly reveal their effectiveness:—

Table 1

Treated fabric	Treatment	Maximum static charge developed	Time for charge to fall to half value in secs.
"Terylene" ..	½% of A	280	1
"Terylene" ..	½% of B	120	1
Nylon	½% of A	12	1
Nylon	½% of B	8	1
"Terylene" ..	½% of C	128	1
Untreated "Terylene" fabric		2,300	32
Untreated nylon fabric ..		1,400	12

Products *A*, *B*, and *C* were prepared from the following components:—

Product	Fatty acid			Glycerine + Ethylene oxide
A	1 mole	Lauric acid	<—	1 mole + 6 moles
B	1 mole	Lauric acid	<—	1 mole + 24 moles
C	3 moles	Lauric acid	<—	1 mole + 24 moles

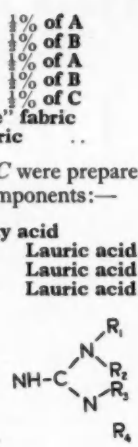
Fig. 3

Dyeing Wool Evenly with Milling Dyes

It has recently been discovered (B.P. 812,852) that certain substituted guanidines conforming to the general formula (Fig. 3) in which each of the symbols R^1, R^2, and R^3 (these may be the same or different) represents a hydrogen atom or a mono-cyclic aromatic, aliphatic, or cyclo-alkyl radical, and R^4 represents the same radicals but not hydrogen, can be used with advantage in the dyebath to promote the even dyeing of wool with many so-called milling dyes. The effectiveness of such a guanidine derivative is generally greater when the substituents R^1, R^2, R^3 and R^4 are strongly hydrophobic so that the product is not completely soluble in water. Thus typical substituents represented by R^1, R^2, R^3 and R^4 include tolyl, phenyl, cyclohexyl, benzyl, and aliphatic hydrocarbon radicals such as butyl, dodecyl, and stearyl radicals. Specific products are sym.- diphenyl-, tetramethyl-, and dibenzyl- guanidines having the formulae shown in Fig. 4.

The milling dyes whose levelling properties can be especially improved by application in the presence of one or other of these guanidine products are those drawn from the group of acid wool dyes and differing from the more conventional acid dyes in that they give dyeings which have a higher degree of fastness to milling or alkaline scouring. They also give these fast dyeings when applied from a dyebath of pH5 or higher, and include a limited number of direct cotton dyes which can be applied to wool under neutral dyeing conditions.

The maximum amount of the guanidine compound needed in the dyebath is about 4% calculated on the weight of the wool goods but usually 2% is sufficient; for light shades even smaller proportions can be satisfactorily used. Since the guanidine compound is generally water-insoluble it is best employed in the form of a stable aqueous dispersion such as can be made with the aid of an anionic or non-ionic dispersing agent of the type of highly sulphonated castor oil, 1-iso-butyl-4-ethyloctyl sulphate, and the mono-para-octylphenyl ether of diethyl glycol sulphate. A highly sulphonated castor oil has been found to have a dye levelling action of its own and can thus assist the action of the guanidine compound. The best type of dispersion is one containing for each part of the guanidine compound 4 to 12 parts of a mixture of a highly sulphonated castor oil with an alkylarylpolyether sulphate which has a much higher solubilising action than the former for the guanidine compound.

For dyeing it is recommended to prepare a liquor at 80 to 110°F. containing the guanidine compound dispersion and then work the material in it for a few minutes. The dye is then added and the temperature is raised to the boil. The initial pH

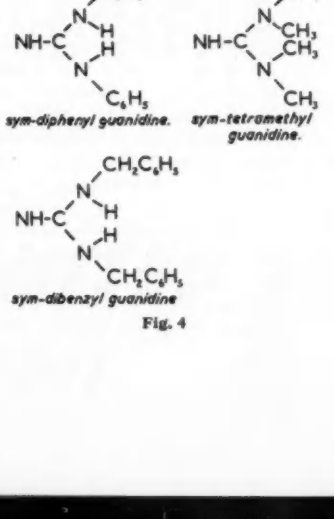

Fig. 4

should be about 7 so as to ensure that only about 20 to 40% of the total amount of dye present exhausts upon the wool within the first 10 mins. of dyeing. It is advantageous later to lower the pH and this can be achieved gradually by having present an ammonium salt such as ammonium acetate, sulphate, or phosphate capable of liberating acid. It should be arranged in this way that the final pH when dyeing is complete is somewhat higher than 5 - 6 according to the particular dyes used. Level dyeing is assisted by slow dyeing but it is generally satisfactory for dyeing at the boil to continue for 30 to 60 mins. The following method is typical for obtaining level dyeing.

First, 140 lbs. of wool fabric are run for 10 mins. in a liquor prepared with 1,000 galls. of water at 75°F. containing 4·2 lbs. of ammonium acetate and 0·56 lbs. of sym.-diphenylguanidine dissolved in a mixture of 3·5 lbs. of sulphonated castor oil and 1·4 lbs. of Tergitol NPX (an alkyarylpolyglycol non-ionic dispersing agent). This liquor has an initial pH of 7·5. Then a mixture of 3·85 lbs. of Polar Brown 2GL (Geigy), 0·14 lbs. of Erie Scarlet B, and 0·112 lbs. of Alizarine Cyanine Green G is added and inside the next 60 mins. the temperature is gradually raised to the boil. Dyeing is continued for 45 mins. at this temperature to secure satisfactory exhaustion while the pH lowers to 6. The dyed goods, rinsed, and dried, have an excellent soft handle and a level brown shade.

Production of Seersucker and High Lustre Effects

Recent discoveries by Speakman and his colleagues at Leeds University indicate that valuable finishes fast to water and steaming in a Hoffman press can be given to wool fabric by a simple treatment in which the fabric is impregnated with a dilute solution aqueous of a bisulphite containing a lower aliphatic alcohol such as ethylene glycol and is then subjected to a mechanical-assisted high temperature treatment. A high lustre can be secured by impregnating wool fabric with a 1% solution of sodium meta-bisulphite in a 37% aqueous solution of ethylene glycol and then hot pressing in contact with a polished metal plate at about 180°C. (J. Text. Inst., 1958, **49**, 627*T*). To secure seersucker warp stripe effects the fabric should be treated (J. Text. Inst., 1959, **50**, 473*T*) with the meta-bisulphite solution and then run through a compressive shrinkage machine having a heated top roller grooved at right angles to its axis as described by Davis (J. Soc. Dyers and Col., 1958, **74**, 8) and maintained at about 180°C.

Experience has shown that it is not satisfactory to use a simple aqueous solution of the meta-bisulphite since the rapid evaporation of water from the wool fabric during hot pressing disturbs the surface; it is left less smooth than it might be and much lustre is lost. This disturbance is avoided by having ethylene glycol of higher boiling point present since it readily diffuses into the wool fibres and remains throughout the hot pressing.

Ethylene glycol may be replaced by glycerine but because of the lower rate of diffusion of this into the fibres, more time is needed for it to penetrate before hot pressing. Other reducing agents may be employed, e.g., sodium bisulphite or sulphur dioxide itself. The permanence of the finish is obviously associated with a breaking of the disulphide bonds present in the keratin of the fibres and reformation in a modified form.

The conditions found suitable are pressure of 115 lbs./sq. in. at 180°C. for 50 secs., but lower temperatures may be used. At such a high temperature the wool is not harmed since evaporation of some of the ethylene glycol produces a cooling effect.

Dyeing Polyester Fibre Goods

B.P. 815,738 discloses that the absorption of disperse and pigment dyes can be greatly assisted by having 1 : 4-dioxane present in the dyebath. Under such conditions the fibres absorb more dye so that they become more deeply coloured and the dye is distributed more uniformly throughout each fibre. Polyester fibres do not easily absorb dyes of the disperse type unless powerful dye-carriers are employed in the dyebath or dyeing temperatures exceeding 100°C. are used. 1 : 4-dioxane, a colourless liquid boiling at 101°C., is completely miscible in water. It results from the dehydrochlorination of ethylene chlorohydrin in the presence of caustic soda as shown in Fig. 5.

In a typical dyeing procedure the polyester fibre goods are dyed for about 60 mins. at 95 to 100°C. in a dye bath containing per litre, 2·5 grams of the dye, say the red monoazo dye obtained by coupling diazotised 1-amino-2-methoxy-4-nitro-benzene with 2 : 3-hydroxynaphthoylaminobenzene, 5 grams of the reaction product (a dye dispersing agent) of 20 moles of ethylene oxide with one

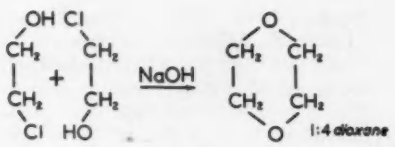

Fig. 5

mole of octadecyl alcohol, and 500 grams of 1 : 4-dioxane. No appreciable deterioration of the polyester fibres occurs and a deep red shade is obtained. An advantage of this use of 1 : 4-dioxane over the usual dye-carriers is that it leaves no objectionable odour in the dyed goods. Certain of the commonly employed dye-carriers are aromatic compounds which tend to be absorbed into the dyed fibres and be tenaciously held thus conferring a characteristic unpleasant aromatic odour.

Effects of Wear and Laundering on Wrinkling

At present when increasing amounts of so-called "minimum-iron," "drip-dry," and "wash and wear" fabrics and garments are being produced, much greater attention is being given also to methods for evaluating the every-day performance of these so that finishing processes may be steadily improved. The general method hitherto adopted for testing wrinkling or creasing properties of fabrics consists of folding a strip of the fabric and then pressing it under a suitable weight; thereafter the fabric is allowed to return as much as it will to its original state and the crease-angle is then measured. The fold may be in the warp or weft direction. In a more recently devised method of testing the fabric is indiscriminately folded in all directions and is then subjected in this state to pneumatic pressure. In this test it is not possible to measure all the crease angles for these are in all directions and may actually cross so that the resistance to creasing has to be assessed from the overall appearance.

It appears that at this stage of testing there is need for more accurate methods of testing while it is not yet generally agreed that the methods at present available do actually correspond with the conditions of use of the textile material. This latter aspect is of special interest and is now being more widely investigated. For instance, the Textile Fibres Dept. of E. I. du Pont de Nemours and Co., America, have recently examined the manner in which the wrinkling properties of various types of fabric are affected by wear and repeated home laundering and some interesting

results have been obtained for "Dacron," "Orlon" + wool, wool, "Dacron" + nylon, and untreated and crease-resist treated cotton fabrics. The results obtained have been published by Wilkinson and Hoffmann (J. Text. Research, 1959, **29**, 652).

Wilkinson and Hoffmann recognise six specific locations in a garment which are normally subject to wear—at three locations (back, seat, and beltline) compression wrinkles may occur and at the remaining three locations (sleeves, legs, and in the lap of garments) the wrinkles can arise from fabric (body) movement. In the first three, the fabric of the garment is compressed between the body and some other surface, and in the second three the fabric is compressed between two parts of the body as the result of body movement. It has been observed that these differences of location result in the formation of two types of wrinkles. Compression wrinkles are usually sharp and numerous and their direction varies on the location and type of garment. Thus trouser wrinkles usually wrinkle on the bias and across the warp in the seat areas while blouses wrinkle in random fashion on the back; the wrinkles formed in a man's shirt under the belt are of the compression type.

The wrinkles resulting from body movement as in the sleeves and the lap of a garment are quite different in that they are normally long and rounded; they are usually across the warp yarns which run vertically up and down in most garments. Intermittent flexing of the fabric in these particular locations causes the warp yarns to be repeatedly bent in the same location so that this particular type of wrinkle is especially noticeable on coats, trousers and skirts. From the above it becomes apparent that laboratory wrinkle tests should take into account these different types of wrinkles and it is necessary to give attention to whether the type of fabric under test is likely to become wrinkled in wear in one direction only or in all directions.

Factors which apparently influence the formation of creases during wear are:—

(1) Temperature of the fabric in contact with the body.
(2) Moisture content of the fabric while in such contact.
(3) Pressure under which the fabric is creased or otherwise deformed.
(4) Duration of the deformation, and time for recovery.
(5) Number of times the fabric is bent or creased in the same locatino.

Investigations of these factors revealed that fabric temperature generally attains 90 to 95°F., 5 mins. after body contact and this temperature returns to its original value within 2 mins. after being released from body contact. Special apparatus designed to measure the relative humidity of the atmosphere around fabrics when they are deformed in the seat area showed that the R.H. if the wearer has not been active (e.g., walking) is 60% and this rises after sitting for 30 mins. to 75%. If the wearer has been active immediately prior to sitting then the R.H. rises to 85%. Under high temperature humid conditions involving perspiration the R.H. rises to 90 - 95%. It may be recalled that most crease-resist tests are carried out at 65% R.H. and it is now recommended that supplementary tests should be made at 95% R.H. at say 90 - 95°F. In this same connection it was found that "Dacron" and wool skirts could be worn several days without creasing but when the day became hot and humid creases developed and remained thereafter.

An important point about the pressure usually applied in an ordinary crease-resistance test and the pressure effective when a fabric is compressed by the human body (as for instance, when a garment seat is compressed by a sitting person) is that the body being soft has a modifying influence on this pressure. In the usual method of testing the fabric under test is compressed in a folded condition as shown in Fig. 6 where a load of 500 grams is shown pressing downwards on a fabric fold with a metal spacing strip of about 0·0005 in. thick. All surfaces in contact with the fabric are hard. This is unrealistic, and Wilkinson and Hoffmann have suggested that the laboratory test for crease resistance should be carried out using compression apparatus in which the folded fabric is pressed between a softer material (a 1 in. thickness of foamed rubber sheeting has been found satisfactory). Using apparatus of this modified type Wilkinson and Hoffmann tested the crease resistance values of different fabrics of "Dacron," wool, "Orlon," cotton, and rayon and the results (in comparison with those obtained with the usual method of compressing the fabric between hard surfaces) are shown in Fig. 7. In the case of wool, "Orlon," and rayon fabrics the new method of testing clearly indicates a lower crease resistance whilst in the case of cotton it indicates a higher crease resistance. These workers also observe that the crease resistance indicated by the new testing method corresponds much better with the actual wear tests of these particular fabrics.

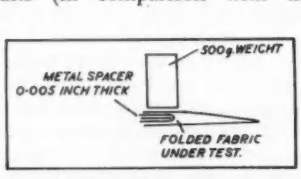

Fig. 6. Essential features of crease resistance testing apparatus

It has been established that the agitation of a creased fabric in a washing machine can be useful in removing wrinkles such as have been formed in the previous wearing of the fabric. But in the hydro-extraction which can follow washing to remove excess of water the pressure imposed on the fabric in the hydro-extractor can be responsible for the formation of new creases and these can be pronounced. In fact, it is considered that hydro-extraction is the most harmful operation in home laundering from the viewpoint of producing permanent creases.

Wilkinson and Hoffmann consider that the pressure conditions during hydro-extraction produce the creases and that the cooling of the fabric during this same operation (part of this cooling arises from evaporation of water from the fibres in addition to the cooling which occurs because the rotation of the basket of the centrifuge induces through the fabric a current of the surrounding cold air) sets these creases. It is believed that with fabric made from thermoplastic fibres such as nylon and Orlon that the chilling effect which attends removal of the warm hydro-extracted fabric from the basket is especially responsible for setting creases. For this reason, it is better to hydroextract thermoplastic fibre materials when wet with cold water rather than with warm to hot water for the subsequent harmful chilling is then avoided. The average pressure exerted on the fabric during hydro-extraction in a home-used machine is about 2 lbs./sq. in.

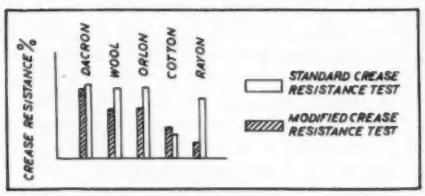

Fig. 7. The crease-resist values of fabrics made from different materials, using the modified Wilkinson and Hoffmann apparatus

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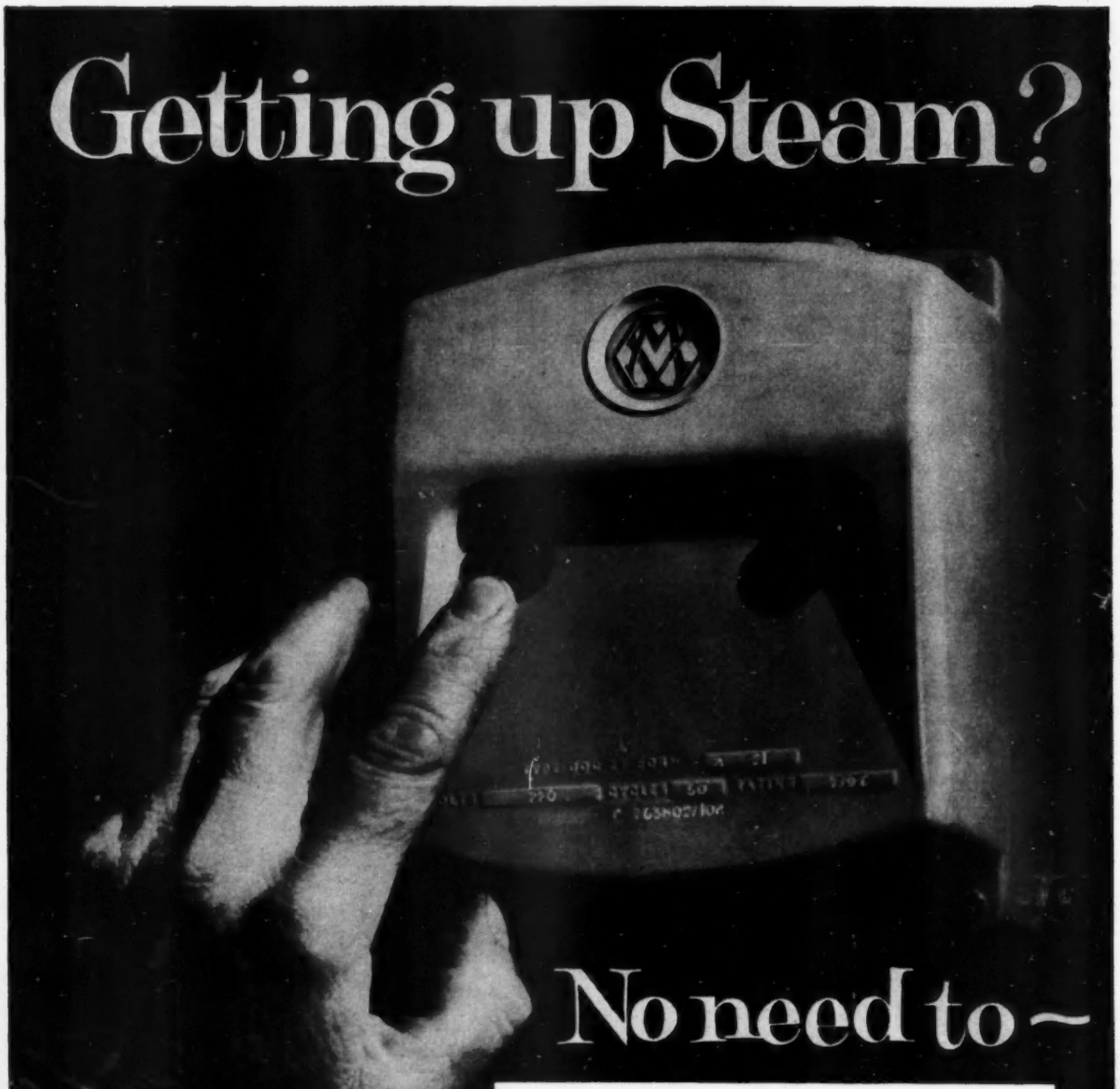

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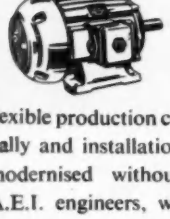

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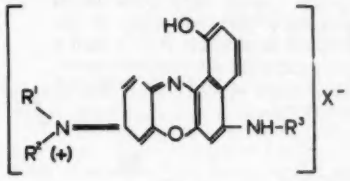


Fig. 8

in which R^1 means hydrogen, alkyl or substituted alkyl, R^2 means alkyl, substituted alkyl, aryl or aralkyl, R_5 means hydrogen or a $—CH_2—CH_2—CH_2—$ or a $—CH_2—CH(OH)—CH_2—$ group linked to the aromatic nucleus in ortho- position to —NH—, and X means an acid radical, have recently been discovered to be easily applicable to acrylic fibres made from polyacrylonitrile and copolymers of acrylonitrile with not more than 15% of another component so as to give these fibres bluish green to reddish blue shades having very good fastness properties and especially an excellent fastness to light. They can be applied by conventional dyeing methods and equipment and do not require a dyeing temperature exceeding 100°C. These new dyes can be prepared by known methods, including the reaction of 4-nitroso-3-hydroxy-aminobenzenes with 1-amine-5-hydroxy-naphthalene or 7-hydroxy-1 : 2 : 3 : 4-tetrahydrobenzoquinoline. Another method is to react 4-amino-2-hydroxyazobenzenes with 1-amino-5-hydroxynaphthalenes. Two typical preparations of these dyes may be given.

In the first, 20 parts of the hydrochloride of 1-amino-5-hydroxynaphthalene and 31 parts of the hydrochloride of 4-nitroso-3-hydroxy-1-dimethylaminobenzene in 100 parts of water are refluxed for two hours. The product is then poured into 300 parts of ice water and the oxazine dyestuff thus obtained is salted out with a 20% solution of common salt. This dye (A) has the formula shown in Fig. 9 and when applied to polyacrylonitrile fibres at 100°C. from a dye liquor containing 3% of 30% acetic acid and 1·5% of sodium acetate it gives a bluish green shade of excellent fastness to light as well as other influences. In the second method of preparation 8·6 parts of the hydrochloride of 1 : 2 : 3 : 4-tetrahydro-3-

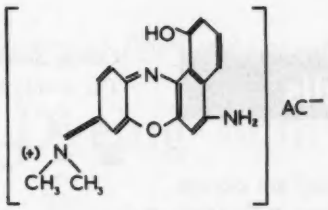


Fig. 9

hydroxy-(7 : 8 : 1′ : 2′)-6-hydroxybenzoquinoline, 100 parts of glacial acetic acid, and 10·8 parts of the hydrochloride of 4-nitroso-3-hydroxy-1-diethylaminobenzene are boiled together for ten minutes. The product is then poured into 250 parts of ice water and the dye having the formula shown in Fig. 10 is salted out. It gives bluish green shades on polyacrylonitrile fibres having excellent fastness to light.

While these new dyes are applicable by conventional dyeing methods they can also be applied by printing techniques. For example, the dye *A* described above can be used in the

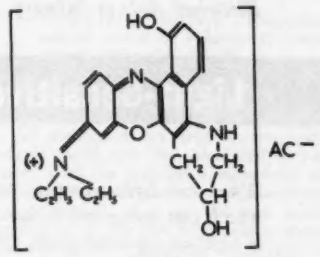


Fig. 10

preparation of a printing paste having the following composition:—

30	**grams of the oxazine dye** *A*	
30	**„**	**„ 30% acetic acid**
500	**„**	**„ a gum arabic thickening**
360	**„**	**„ water**
30	**„**	**„ zinc nitrate solution (sp. gr. 1·5)**
50	**„**	**„ thiodiethylene glycol**

The polyacrylonitrile fibre fabric is printed with the above paste, dried, steamed for one-half hour, and then rinsed with water. A bluish green printed pattern of excellent fastness to light and very good other fastness properties is thus obtained.

New Books

SKINNER'S WOOL TRADE DIRECTORY OF THE WORLD, 1959 - 60. Thomas Skinner and Co. (Publishers) Ltd., 91 Kirkgate, Bradford (price 80s.).

Good indexing and "thumb tabbing" make this directory very easy to use and thorough revision of editorial matter engenders a feeling of confidence in its reliability.

The preliminary pages include statistical tables of the wool industry, details of wool trade organisations throughout the world and a diary of outstanding events in the wool and allied trades over the past century. The first of the three principal divisions of the directory contains lists of companies arranged alphabetically within branches of industry in Great Britain and Ireland, mills also being indexed by location. Similar lists follow for overseas countries. Names of suppliers of raw materials, yarns and fabrics are given in the buyers' guides and mill requirements can be found in the mill supplies and services section. The headings and much of the indexing of this directory are repeated in French, Spanish, Portuguese, German, and Italian.

* * *

RAISING PRODUCTIVITY IN SMALLER FIRMS. British Productivity Council, 21 Tothill Street, S.W.1 (price 2s. 6d.).

That there is considerable scope for raising productivity and lowering costs in smaller firms by the use of modern methods. Based largely on the work of the National Union of Manufacturers Advisory Service (N.U.M.A.S.), this booklet describes what has been done in twelve typical small firms through techniques such as work study, costing, production control, office organisation, and incentive schemes. The case histories are from firms ranging in size from 6 to 300 employees, including commercial vehicle body building, manufacture of electrical components, narrow tapes and fabrics, lithographic printing, plastics, measuring implements, office and school equipment, and horticulture.

* * *

FINISHING PROPERTIES OF COTTON FURNISHING FABRICS. British Standards Institution, 2 Park Street, London, W.1 (price 3s.).

Curtain and loose cover fabrics conforming to this new British Standard (B.S. 3153: 1959) should give adequate resistance to fading and to "tendering." The specification was developed from proposals put forward by the cotton industry. The main purpose of the standard is to safeguard the quality of dyestuffs used. This is partly achieved by laying down minimum levels of fastness to light, but because there are some dyes which, though relatively unaffected by sunlight, may deteriorate if exposed in the damp atmosphere close to a window, it is also necessary to specify fastness to humid conditions. For this purpose the standard quotes a washing test.

* * *

MANUAL OF THE TEXTILE INDUSTRY OF CANADA 1959. Canadian Textile Journal Publishing Co. Ltd., 223 Victoria Avenue, Montreal 6.

An up-to-date review of the Canadian textile industry is presented in the thirty-first annual edition. The editorial matter includes ably-written articles on potentialities and prospects for textiles and contains contributions by British experts on trends in textile finishing and development in British machinery. The directory section, which forms the bulk of the volume, contains a list of members of the nine technological groups affiliated with the Textile Technical Federation of Canada; a first listing of textile chemical specialities; a buyers' guide to machinery and supplies and a mill directory.

CUT HERE

Light-Sensitive Cells

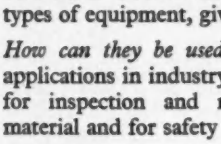
What are light-sensitive cells? They are devices which can sense and measure changes in the level of light or, in some cases, respond to the quality of light falling on them. There are various types of cell and each has its particular field of use. One of the best known is the photo-electric cell.

What can light-sensitive cells do? A change in the amount of light falling on the cell can cause a switch, relay or counter to operate. Alternatively, the direct indication of the light intensity can often allow some other factor to be determined and, if required, controlled. They are reliable and require little maintenance. Careful installation, as with all types of equipment, gives a good reward.

How can they be used? These cells have many applications in industry, for controlling processes, for inspection and measurement, for sorting material and for safety purposes:

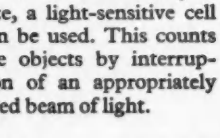
Counting

Where objects on a conveyor belt are too soft or light to operate a direct mechanical counting device, where they are too delicate or freshly painted to sustain physical contact or where the articles vary in size, a light-sensitive cell can be used. This counts the objects by interruption of an appropriately sited beam of light.



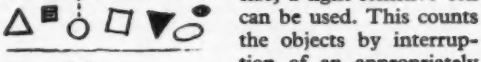
Hopper or Tank Level Control

Many forms of feed can be accurately controlled by light cells. One important one is for controlling the input to a hopper of fluid solids such as sand or peas. Here, two horizontal light beams are required: the upper, when interrupted, indicates that the hopper is full and stops the supply; the lower, when it ceases to be interrupted, indicates that the hopper is nearly empty and restarts the flow.



Package Content

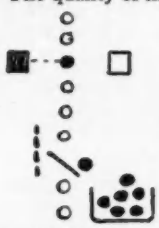
The level of powder in packages can be checked with light cells. The cell is so positioned that when the



powder is up to the required level, the light reflected from the surface of the powder is picked up by the cell and causes the carton to be accepted. If not, it is rejected.

Colour Sorting

The quality of many articles can be gauged by their colour—seeds and nut kernels, for instance. The objects are fed into a tube by means of a vibrator pan and fall into the beams of three equally spaced light cells which scan them from all sides. If the object is acceptable it falls into a chute carrying it to one conveyor; if its colour is bad it is deflected as a reject.

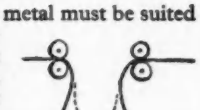


Guillotine Guard

Light cells for guarding a guillotine or power press should be used only as a supplement to a mechanical guard or where the latter is impracticable. The interruption of a curtain of light by a hand stops the machine instantaneously.

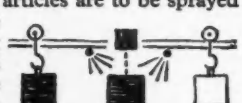
Press Feeding

Where the rate of feed of strip metal must be suited to a varying speed of acceptance by a press, a loop of the strip is allowed to sag between the feed and the press. When the loop reaches a predetermined depth a light beam is interrupted and the slack is taken up.



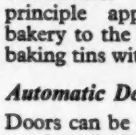
Processing Objects on the Move

Many articles are processed while on a conveyor line. For instance, where articles are to be sprayed while on the conveyor, the paint saved by stopping the gun between articles will make the device worthwhile. The same principle applies in a bakery to the spraying of baking tins with fat.



Automatic Door Opening and Closing

Doors can be caused to open or close by the interruption of a beam of light. This has its uses in such cases as control of doors on a heating oven or for the passage of vehicles in a factory. This is effected by a light beam on the side from which the approach is made (in many cases, both). When the approach beam is interrupted it opens the door which closes again after a given time interval.



For further information, get in touch with your Electricity Board or write direct to the Electrical Development Association.

An excellent series of reference books are available (8/6 or 9/- post free) on electricity and productivity — "Higher Productivity" is an example. E.D.A. also have available on free loan a series of films on the industrial uses of electricity. Ask for a catalogue.

Issued by the Electrical Development Association
2 Savoy Hill, London, W.C.2

Society of Dyers and Colourists

Mechanism of Dyeing with Procion Dyes

WHEN the first three Procion dyes were made available in 1956 it was evident that a new era had begun in dyeing. Since that time the Procion range of reactive dyes had expanded very considerably and had been joined in markets all over the world by other reactive dye systems. Reactive dyes as a class were now well established and because of their increasing importance it was worthwhile attempting to uncover the basic principles underlying their application, said Mr. H. H. Sumner, B.Sc., in a recent address to the Manchester Section of the Society of Dyers and Colourists.

The classical concepts of affinity and diffusion must play an important role but, in addition, the reactivity of the dye must be a controlling factor. In all reactive dye systems dyeing was essentially a competition between reaction of dye with the fibre and reaction with water. Since water was frequently present in great excess it was at first sight surprising that such a system could be successful. It was the object of the present work not only to indicate the relative importance of affinity and diffusion but also to show why it was that reactive systems for dyeing were in fact possible.

The rates of reaction of cold dyeing Procion dyes (dichloro-s-triazine derivatives) with water and the carbohydrate mannitol (as a simple "model" for cellulose) had been followed at various alkalinities. This showed that the reactivity of the dye for both water and mannitol increased as the alkalinity increased, the reaction with water increasing more than that with mannitol. This indication of a bi-molecular reaction was verified by postulating that reaction occurred between dye and the ionised species in solution, i.e., the hydroxylion and the mannitol ion. When the concentrations of the respective ionised species were taken into account it was found that the ratio of the reactivity of dye for the mannitol ion and the water ion became constant at all pH values. For the particular dye studied the ratio of the reactivities mannitol: water was 14 : 1.

The difficulties in extending this approach to the problem of dyeing cellulose resided in two factors. First, there had hitherto been no clear indication as to whether cellulose ions existed under Procion dyeing conditions. In addition, there were obvious complications of transference to and diffusion through the solid phase which was absent in the simple mannitol/water system. By postulating the absorption of sodium hydroxide by cellulose as a process of neutralisation of a base by a weak acid (i.e., by postulating the formation of cellulose ions) one could set up theoretical equations embodying the well-accepted concepts of dyeing thermodynamics. From these it was possible to predict the amount of sodium hydroxide which would be taken up at equilibrium from baths containing various concentrations of sodium hydroxide. The calculated results were in close agreement with the practical measurements. In addition, the theory had been shown, for the first time, to compensate for the fall in substantivity of a dye as the alkalinity increased—a point clearly demonstrated by the fact that a constant affinity could now be calculated for dyeings carried out from dyebaths at various pH values.

The problem of rate of fixation on cellulose had been simplified by using viscose sheet rather than fibre. Rate of fixation, affinity and rate of diffusion had been measured over a wide range of pH values and an equation due to Danckwerts had been applied to the results. This equation had the form

$$Q = C\sqrt{Dk}\,(t + \tfrac{1}{k})$$ where

Q = amount of dye diffusing through unit area of surface which in this case was equated with the amount of dye fixed.

C = equilibrium surface concentration which could be calculated from the thermodynamic affinity.

D = diffusion coefficient.

k = reaction constant of dye with cellulose.

t = duration of the experiment.

All the quantities were known except k which could now be calculated and compared with the reaction constant for water. When this was done it was again found, as for mannitol, that as the pH rose the reactivity of the dye with water increased more rapidly than the reactivity with cellulose. However, when the degrees of ionisation of cellulose and of water were inserted the ratio again became constant over the whole pH range. The ratio $\frac{k \text{ cellulose}}{k \text{ water}}$, for the dye investigated, turned out to be unity.

Thus a surprisingly simple picture of the reaction of Procion dyes (and presumably other reactive systems) with cellulose emerged. The reaction took place between the dye and the cellulose ions produced by neutralisation of cellulose by alkali; the reactivity of cellulose ions appeared to be similar to the reactivity of the water ions although so far no allowance had been made for possible steric effects in the solid cellulose phase. The reason why Procion dyes reacted to a greater extent with fibre than with water was due largely to the greater number of cellulose ions present for a given number of hydroxyl ions in the bath..

Dyeing and Finishing in the Hatting Industry

IN most branches of industry fundamental and technological research was necessary to ensure progress and this position had applied equally well in the felt hat industry, said Mr. B. Kramrisch, F.R.I.C., F.T.I., F.S.D.C. (Ciba Clayton Ltd.) in a recent address to the Manchester and District Section of the Textile Institute. In this country, apart from fundamental work on the mechanism of the felting of wool and other animal fibres by Speakman and his co-workers at Leeds University and by others at Wool Industries Research Association, problems of all types specifically applicable to the hatting industry were investigated by the British Hat and Allied Feltmakers Research Association in Droylsden.

Many factors such as felt quality and degree of carrotting influenced subsequent dyeing behaviour. Acid levelling (Kiton and Kiton Fast) dyes were used mainly on wool felt hoods and also to a wide extent on fur felt hoods. For the latter however aggregated (Benzyl Fast and Alizarine Fast) dyes and metal complex dyes might have to be considered, especially for heavy shades such as bottle green, dark brown, navy and black where a high standard of fastness to (water and perspiration) was required. Both 1 : 1 (Neolan) and 1 : 2 (Cibalan) complexes were of interest. The latter type required the addition of Cibalan Salt S for application under acid conditions. Both aggregated and 1 : 2 metal complex dyes were of interest for loose wool and fur for mixture hoods as they withstood acid milling.

Reactive (Cibacron) dyes had been examined for application to wool and similar fibres and it had been found that bright shades of good fastness could be obtained by using Neovadine AN or AL in an acid bath. Cibacrolan dyes were applicable by the same technique and permitted the production of bright blue and green shades in a much higher standard of fastness to light than obtainable with acid dyes. Both these ranges of dyes were of interest for hoods to be given a melusine finish.

Various types of dyeing machinery for wool and fur felt hoods were described, particularly regarding their application with different classes of dyes. Some interest was aroused from time to time in printing hats either for direct print or discharge styles using metal stencils.

Two-colour effects, i.e. contrasting shades on the inside and outside of hats could be achieved by dyeing the hoods first to one shade in the normal manner and then applying a contrasting colour to the other side with a brush or spray gun, using a suitable printing paste. Alternatively, two differently coloured printing pastes could be applied to either side of an undyed hood. Intermediate drying and subsequent steam fixation was necessary and both Cibalan and Cibacron dyes were of particular interest for this technique.

Trade Literature

HOLMES KEMP DRYERS. The range of dryers described in Publication No. 77, has been redesigned to give higher efficiencies at lower cost. By the use of new type four-zone heaters, one in each tower, higher heat input is achieved, and this together with more effective heat distribution has resulted in higher desiccant capacities for each size of dryer. It is said that a dryer using the new heaters will, with no increase in the amount of solid desiccant used, remove approximately 10% more moisture. Further details from W. C. Holmes and Co. Ltd., Turnbridge, Huddersfield.

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DUST COLLECTION. Keith Blackman Ltd., Mill Mead Road, London, W.17. Publication No. 46 deals with the company's range of fabric type dust collectors, Series TF. Designed to collect fine dry dusts, the series is available in sizes for handling from 2,000 to 50,000 cub. ft. of dust-laden air per minute. The form of unit construction employs a basic element of 16 filter bags giving a total filtering area of 200 sq. ft. The complete range is obtained (with the exception of the smallest unit) by stacking two or more basic elements together. This unit construction provides flexibility and compactness.

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DIXYLON PLASTIC BELTING. A new illustrated catalogue featuring Dixylon plastic transmission belting has been released by R. and J. Dick Ltd., Greenhead Works, Glasgow, S.E. It gives useful information on belt thicknesses, co-efficients of friction, horse power rating per width of belt, etc., and claims that the performance of the belt is unaffected by humidity, dryness, or dust provided these factors are taken into account when calculating the initial belt tension.

A development of this new plastic belting is Dixylon Suplex, oil-resisting belt said to retain its co-efficient of friction even when operating where large quantities of running oil are present.

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NEW LABORATORY EQUIPMENT. The first of two new illustrated catalogues from Baird and Tatlock (London) Ltd., Freshwater Road, Chadwell Heath, Essex, concerns the chromatographic drying oven. Specially designed to incorporate accurate temperature control and air circulation with variable settings, the new oven is said to dry chromatograms, safely, evenly, cleanly and quickly. The second leaflet describes and illustrates the B.T.L. Fraction collector, a development said to meet entirely, current chromatographic needs.

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MORGANITE CARBON VANES. Designed for use in rotary air or gas compressors and liquid pumps, the self-lubricating vanes described in leaflet SD combine several remarkable properties resulting in a chemically inert, non-metallic vane. The manufacturers—Morgan Crucible Co. Ltd., Battersea Church Road, London, S.W.11—say that no maintenance is required and being non-hygroscopic and unaffected by temperature assures dimensional stability.

NANSA DETERGENT POWDERS. Machon Products Ltd., Whitehaven, have recently published a descriptive list of various free-flowing alkyl aryl based powders now available in commercial quantities. Known as the Nansa range, the seven powders described are said to have excellent wetting powers together with powerful detergent characteristics.

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B.N.S. OUTLOOK. Published by British Nylon Spinners Ltd., Pontypool, a recent edition of this very interesting publication contains six illustrated articles of considerable interest to technical and administrative staffs. The titles are: "The Engineer and Textile Development," "A New Agilon - Agilon D," "British Nylon Spinners Library and Information Service," "The Indian Handloom Industry," "Wash and Wear Properties of Nylon Shirts," and "Nylon Ropes."

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B.C.L. POLYETHYLENE FILM. Intended primarily as a general introduction to the properties and uses of polythene films available in the B.C.L. range, a new ten-page booklet provides considerable information of a technical nature: gauges and nominal yields, types of film, and methods of manipulation are dealt with together with a few examples of this versatile wrapping mediums uses. Supplied free, on application to British Cellophane Ltd., 9 Henrietta Place, London, W.1.

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APPLICATION OF MOLYBDENISED LUBRICANTS ON MACHINE TOOLS. A set of useful notes are available, free of charge from Rocol Ltd., Swillington, near Leeds, giving suggested applications for Rocol molybdenised lubricants on machine tools. The notes are sectionalised: general, grinding machines, lathes, boring and planing machines, drilling machines, shaping machines, gear cutters and milling machines.

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WESTERN NIGERIA. Published for the Government of Western Nigeria by Patrick Dolan and Associates, 10 Bruton Street, London, W.1, this valuable 31-page booklet provides very useful information, invaluable to the prospective seller to Nigerian markets. The booklet outlines the astonishing progress made in recent years both in agriculture and industry. Special facilities offered to the investor are discussed together with the government policy on foreign capital.

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WIGGIN NICKEL ALLOYS, No. 53. The latest edition features uses of Wiggin products ranging from an advanced electrical furnace to sea water evaporators. A notable contribution is the article by R. McGlashen, C.G.I.A., A.M.I.E.E., on the use of the Brightray series of nickel-chromium electrical resistance materials in pre-heating for welding and stress-relieving of large vessels. "Wiggin Nickel Alloys" is free on request from Henry Wiggins and Company Ltd., Thames House, Millbank, London, S.W.1.

MECHANICAL SEALS. Flexibox Ltd., Nash Road, Trafford Park, Manchester 17, have produced a new mechanical seal catalogue describing the full range of Flexibox balanced and unbalanced mechanical gland seals for all types of rotary shaft equipment—pumps, mixers, agitators, compressors, etc. The catalogue is intended to provide mechanical seal users with a rapid means of selecting the correct type and size of seal for any given application. To this end tables of essential dimensions, operating limits, power absorption and frictional heat development nomograms and details of PV ratings have been included. In addition a recommended materials specification for seal components is given for more than 350 fluids.

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TRAINING SERVICES IN INDUSTRY. This 39-page booklet from the Industrial Training Council, 36 Smith Square, Westminster, London, S.W.1, price 1s. 6d., explains what is being done by employers' associations to provide adequate training services and facilities for their component members. It is in three sections, the first describes the main functions of these services, the second lists a good selection of industrial examples, and the third gives training services provided by other established organisations such as the City and Guilds of London Institute, Ministry of Labour and the Industrial Welfare Society.

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DYEING AND FINISHING FOR THE RETAIL ASSISTANT. Bradford Dyers' Association Ltd., 39 Well Street, Bradford 3, are responsible for this very necessary, well illustrated publication. This revised edition provides the same wealth of assimilable, non-technical information as its well received predecessor, and includes details of recent developments; bringing information as much up to date as is possible in these days of ever increasing rapid technical advancement.

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AUTOMATIC CONTROL VALVES. Data Sheet LO, issue 3, from Black Automatic Controls Ltd., Seafield, Corsham, Wilts., provides a general idea of the extensive range of valves manufactured by the company. Thirteen types of valve are illustrated and specified in this particularly well-produced catalogue.

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FIRST AID OUTFITS. Made to conform to specifications laid down by the First Aid boxes in Factories Order 1959, the boxes featured in a new catalogue from Cuxson, Gerrard and Co. Ltd., Birmingham, are of a very high standard, providing good value at a reasonable price. They are in three sizes to suit factories where operatives do not number more than 10, 50 or 100.

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ELECTRICAL EQUIPMENT. The first of two illustrated leaflets from Lancashire Dynamo Nevelin Ltd., Hurst Green, Oxted, Surrey, provides specifications and other items of information regarding Direct-on-Line and Star Delta, dustproof, push-button operated, motor starters. The second concerns Nevelin fused distributor boards, specially designed to provide ease of installation, and to ensure dust and weather proofing.

Textile Trade and Prospects

Linen Trade Review

Immediate problems in spinning and weaving are concerned more with coverage and margins than with efforts to secure new business. Most firms have sufficient orders booked to absorb production until well into the new year, but few have reserve stocks of flax or yarns to provide them with coverage exceeding a few weeks. The problem of margins arises from the uncertainty of the raw material supply position. Favourable weather conditions enabled retting to be continued into October. Consequently scutch mills were late in stepping up production to the level of demand normally experienced at the beginning of the season, and which has been accentuated this year by the increased activity in consumer markets for linen. There is evidence also of a deliberate policy by flax processors to regulate the volume of material on offer in order to force up price levels, to recoup losses incurred by the decline in prices last year.

This is, and will continue to be strongly resisted by spinners, as the prices at which much of the business on hand has been booked permit little, if any, margin for higher raw material rates. Future trends in raw material values depend largely on the attitude of the Soviet flax authorities to exports and prices. They have not yet entered the market as large scale sellers, but reports of a substantially greater sowing, and of a favourable out-turn, suggest that these may be at least on the level of last year.

The standard of efficiency now ruling in most mills and factories leaves little opportunity for further economies with existing plant. While some concerns have carried out extensive re-equipment programmes in recent years there is still much obsolete plant in operation, or monopolising floor space, that could be used to advantage in improving layout to facilitate handling and eliminate bottle necks. The present demand position has provided a further excuse to postpone consideration of measures necessary to establish the industry on a sound economic basis in relation to estimated future demand, and the determining factor of competition in which cost of production will play an important part.

Latest B.o.T. returns for linen exports from this country during the nine months ending September 1959 show a considerable improvement on those for the corresponding period last year, though still substantially below those for the same 1957 period. This upward turn has been due mainly to substantial increase in exports to the U.S.A. and Canada, the total value of goods shipped being up by over 20% in each instance. This despite the fact that—particularly in the former market—British manufacturers have to face strong competition from other European sources as well as from Japan. There is obviously a good demand in most overseas markets for quality linens which British manufacturers are well qualified to supply so long as they refrain from pricing themselves out, and it cannot be too strongly emphasised that, in the present buyers' market, the margin available against upward price movements is extremely small.

The passing of the Irish flax growing industry, on which the fame of Irish linen and the fortunes of its manufacturers were founded has failed to evoke a genuine expression of regret. Except during the world war years, when it was rapidly expanded to constitute the main source of supply, it had in recent times contributed a relatively small percentage of the industry's raw material requirements. None the less it exerted a stabilising influence on world flax prices. The establishment of three major man-made fibre plants in N. Ireland provides an alternative and points a new line of development which linen manufacturers could exploit at relatively small capital outlay.

The growing importance of Ireland as a textile centre is evidenced by the flourishing condition of many of the recently established manufacturing industries, and which need substantial expansion of productive capacity. Details of plans for extension of six factories have just been given in a statement by the N. Ireland Ministry of Commerce. These include Cyril Lord (Carpets) Ltd., Donaghadee, to which an extension of 88,750 sq. ft. is to be added to the existing factory. Earlier this year an advance factory of 73,000 sq. ft. at Carnmoney, Belfast, was also allocated to this company. When both projects are complete it is estimated that the labour force will be stepped up to 1,000.

A 30,000 sq. ft. extension is to be added to the factory of Warp Knitters Ltd., Lurgan, to enable them to cope with the steadily increasing demand for their products, and an extension of similar capacity is being built to the Portadown premises or Ulster Laces Ltd., which manufactures laces and embroideries for the garment industries. Continued progress of the latter in N. Ireland is evidenced by extensions approved for Tir-Oen Ltd., Dungannon, a subsidiary of Moygashel Ltd., and also for Debretta Ltd., Bangor, which specialises in women's and children's outer wear.

Wool Consumption and Production

One of the biggest recoveries in the British wool textile industry in post-war history is shown by the July/Sept. 1959 figures issued by the industry's Bureau of Statistics. Compared with the same period of 1958, U.K. wool consumption increased by 19 million lbs. (clean weight), or 19%, and wool top production by 14·5 million lbs., or 22%. Worsted yarn deliveries were 18·9% higher, woollen yarn production 9·2% greater, and wool cloth deliveries increased by 10·2%, and blanket deliveries by 8·1%. The lowest point of the general textile recession of 1957 - 58 was in the July/Sept. quarter. The new figures reflect the full extent of wool's substantial recovery. Trade and Navigation Accounts of the U.K. show that, in ten months of 1958, wool imports totalled 510·6 million lbs. (actual weight). The figure was 621·2 million lbs., an increase of approximately 20%, in the same period this year.

South Africa's wool production in the 1958 - 59 season totalled 313,614,604 lbs. This was 14 million lbs. more than the previous season's clip and the third highest post-war total. Figures published by the South African Wool Board show that 285·9 million lbs. was auctioned, 1·5 million lbs. exported direct, and 2·8 million lbs. processed before sale or export.

Total wool produced would have been even higher, but serious drought conditions existed in some of the main sheep areas.

Australia's wool cheque for the first quarter of this financial year totalled £52 million—just over £12 million more than that for the same quarter of the last year. Wool sold rose from nearly 220 million lbs. in the first quarter of last year to more than 276 million lbs. in the quarter under review. Chief buyer was Japan whose purchases totalled more than £13·2 million. Second was the U.K., which bought wool worth £9 million. France was the third biggest buyer, purchases totalling £5·28 million, an increase of £1·6 million.

New Zealand's wool exports during the year ended June 30 last were 11% more than in the previous year, totalling 1,553,774 bales compared with 1,395,431 bales, according to New Zealand Wool Commission figures. Exports included 1,194,997 bales of greasy wool, 191,606 bales of slipe wool and 167,191 bales scoured. The U.K. purchases 526,592 bales—33·9% of the total as compared with 37·1% in 1957 - 58.

Jute, Yarn and Cloth Market

There has been more interest in jute yarns and cloth in Dundee during the past month. Demand has been spread over most descriptions and in the heavy end of the trade the position shows great improvement. Orders continue to be placed and this improved demand should continue. Raw jute markets in Pakistan have become firmer and is most noticeable in the higher grades of white jute. Some shippers have withdrawn from the markets and are now only prepared to make offers of medium and lower qualities. The position at present is irregular with up to £5 per ton variation in prices for some grades.

Spinners in Dundee have been purchasing steadily and during October registered sales of jute to the U.K. amounted to 148,000 bales. This figure is greatly in excess of the consumption of the mills during a four-week period. It must be remembered that during season 1958 - 59 registered sales of jute to the U.K. were about 300,000 bales greater than the

SWEET- or dry?

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annual consumption. This shows that Dundee mills must now be holding large stocks of raw material.

Due to the great irregularity in prices being quoted the outlook at present is rather obscure. Offers are being made of Mill Firsts at prices ranging from £107 to £112 and as long as there are sellers at the former level, there should be no change in yarn and cloth rates. If the cheap sellers withdrew from the market it could make the raw material position much dearer but there are no indications at present that this should be the case. Most of this price irregularity is in the case of white jute and recent reports concerning the quality of this crop have been rather disappointing. This may eventually cause wider price margins between the bottom and top qualities of white jute. The quality of the Tossa crop is reported to be about average.

The range of prices being quoted are £107 to £112 for Mill Firsts, £91 to £95 for Mill Lightnings, £79 10s. to £82 for Mill Hearts and £66 to £68 for grade Hearts, c.i.f. U.K., for Nov./Dec. shipment. Grade Tossa-2/3 is still available at £104 and grade Tossa-4 at £94 and in one or two instances £1 per ton less has been accepted for the latter. Continental Tossa-2/3 is at £85 10s. with crack Daisee-2/3 at £93 and grade Daisee-2/3 at £87, Nov./Dec.

The first estimate of area under jute in East Pakistan for the year 1959 - 60 is 1,375,000 acrea as compared with 1,528,000 acres reported in the corresponding estimate for the previous season. This gives a decrease of 153,000 acres which is approximately 10%. It is estimated that this season 1,007,000 acres have been sown with Capsularis variety and 268,000 acres with Olitorious variety, this compares with 1,156,000 acres and 372,000 acres respectively last season. The total licensable acreage for the current year was 1,443,000 acres.

During summer, users of jute yarns and cloth were running down stocks to as low a level as possible because of the weak raw material position at that time. This lack of demand was felt by producers in Dundee, but with the recent stronger raw material position a large business has now been placed and mills and factories are very busy. Most yarn and cloth buyers are covering their requirements a fair distance ahead and there is now very little material available in the near delivery position.

The Calcutta goods market has fluctuated within narrow limits during the past month. A fair amount of buying has taken place with the U.K., mainly for hessians. Indian mills and the Pakistani mills are busy and contracts have been placed for positions up to April/June. Middle East countries, Burma, and Australia have all been in the market which has kept the position firm. Quotations are at 61s. 6d. for 10 ozs. 40 ins., and at 47s. for 7½ ozs. per 100 yds. f.o.b. Calcutta for Nov. shipment, at 61s. 3d. and 46s. 6d. Dec. and at 60s. 9d. and 45s. 9d. Jan./Mar. "B" twills were at 155s. 3d., 153s. 9d. and 152s. 3d. for the above shipment periods.

Healthier Tone in Lancashire Trade

Cotton yarn and cloth markets have continued brighter in tone and turnover than for many months. Compared with the same period a year ago activity and inquiry is in a far healthier state. Raw material prices, quality and delivery are now more stable and sales in all directions far more encouraging. Much of the busier atmosphere results from the knowledge of the extent of the scrapping programme in Lancashire. Although some spinners are reluctant to engage in business some way ahead, others have accepted commitments for well into next year. A large number of people in the trade still incline to the view that this scrapping programme has been taken far beyond the bounds of logical reasoning in view of the over-generous compensation payments inducing shareholders and managements to get "on the band-wagon" irrespective of the age and condition of the machinery involved. In view of this attitude it is hardly surprising that those firms who have decided to remain in business are now beseiged with serious inquiries covering almost every type, count and quality of yarn. Most of the transactions have covered standard weaving qualities in the medium count range in cop, cone, cheese and on ring beams. Doubling wefts have been in better request in medium/fine counts and hosiery qualities have been ordered in greater volume than for a long time. Coarse types and condenser yarns are asked for in more encouraging weights and order books lengthen—slowly but steadily. Considerable interest is shown in blended staple yarns, plain and/or coloured, fancy folded and novelty effect specialities and especially "core" yarns.

Improved margins and far better prospects of more stabilised conditions induce greater confidence in trading circles. In one or two instances, however, labour has already become a problem even where single shift working only is concerned. The real problem, of course, is not a shortage of labour. Labour is always at hand but in present circumstances it has been "sold the pup" once too often and no amount of promise of continuity of work, or slogans, will induce it into the mills again. Can they be blamed for eseking more congenial conditions, lighter work and, in some cases, better pay for less physical and mental effort ?

Trading in cloth follows similar lines with orders coming far more freely in the popular belief that any movement in prices will be up and not downwards. Business negotiated has covered almost every type of domestic and industrial cloths, the bulk, of course, for home trade account. Dress fabrics in a limitless range of designs in dobby, jacquard, screen and roller printed effects have been steadily booked and, it is significant, but one hears much less about trivial complaints now that delivery dates are lengthening. Paradoxical as it may seem, business expansion is accepted in many cases with suspicion, and any contraction brings out all the worst in viscious trading practice. Furnishing fabrics are in keener demand with mixture cloths finding great favour amongst the wide range of attractive traditional and contemporary cloths now available. Rather more business has been done in screen and roller printed designs than in woven dobby and jacquard cloths. The bulk of the business has been centred on patterns in the medium price range. Transactions in industrial cloths have been on much better terms. A wide variety of household textiles has been cov eredduring the month Cotton and mixture sheets have sold much better and quilts in dobby and jacquard styles have been accorded greater support. New constructions in quilts employing terry weave principles have aroused considerable interest from the standpoint of price with novelty. Ordering for the Christmas trade has given greater impetus to the bookings for terry towellings; it is one section of the trade responding, probably, more quickly than any other to new ideas in design and colour. It is pleasant also to record that the interest in a few overseas markets is decidedly better with the Dominions taking most of goods ordered.

Patents Delegation to Russia

The Comptroller-General of the Patent Office, Mr. Gordon Grant, C.B., is leading a small delegation to Russia to discuss the protection available in the U.S.S.R. for British inventions. He will be accompanied by Mr. W. Wallace, assistant comptroller of the Industrial Property Department, and by Mr. H. R. Mathys, Fellow of the Chartered Institute of Patent Agents and a director of Courtaulds Ltd.

* * *

"Acrilan" — Revised Prices

The price per lb. of "Acrilan" fibre delivered anywhere in Great Britain, Northern Ireland and Eire is now as follows:—

2 den. (staple or tow) ..	104d.
2·5 and 4 den. (bulking staple or tow)	96d.
3, 5 and 8 den. (staple or tow)..	96d.
15 den. (staple for carpets) ..	78d.

The above prices apply to both semi-dull and bright fibre.

* * *

I.F.C.A.T.I. Meeting

The next annual meeting of the International Federation of Cotton and Allied Textile Industries will be at Amsterdam, Netherlands, from September 26 to October 1, 1960, at the invitation of the Netherlands' Association of the Cotton, Rayon and Linen Industry and Rotterdam Cotton Association. The meeting will be at the Royal Tropical Institute at Amsterdam, under the chairmanship of Dr. W. T. Kroese.

* * *

New Nylon Plant for South Africa

A £200,000 plant to produce crimped nylon yarn in the Union of South Africa was recently announced in Cape Town by Mr. T. C. Wootton of British Nylon Spinners Ltd. A new company, Nylon Processors of South Africa (Pty.) Ltd., has been established to control operations, and production is expected to start about the middle of next year to build up to full scale over the following 12 months. The plant will supply both dyed and undyed crimped nylon yarn to South Africa's hosiery industry. It is being designed to produce a very substantial proportion of the Union's total requirements of crimped nylon yarn, the consumption of which has roughly doubled since 1956. This yarn is used mostly for men's half-hose but some goes to stocking manufacturers and to circular knitters for the production of swimsuit fabrics and similar materials. At present all the Union's crimped nylon yarn requirements are imported.

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The Creel takes 2,368 eyelets and 672 tubes. Whereas the cost of fitting this Creel with special SINTOX guides would have been £119, the adoption of items from the SINTOX STANDARD RANGE has meant a 55% reduction in expenditure . . . and SINTOX never wears out.

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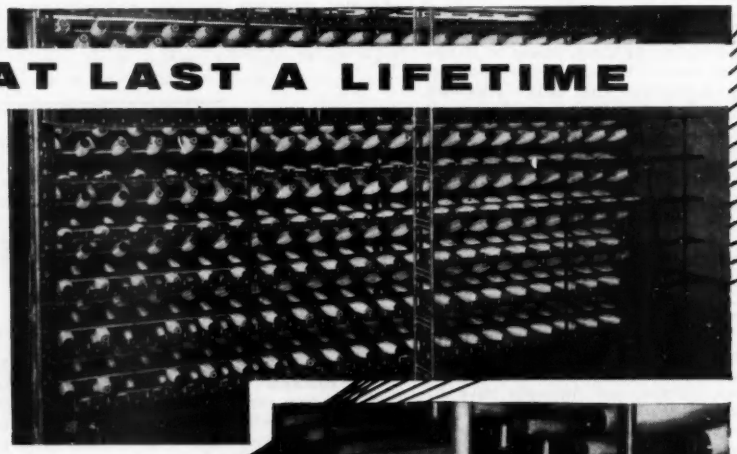

SINTOX

CERAMIC THREAD GUIDES

T.1

Notes and News

Printed Tufted Carpet

A new process for the continuous printing of viscose tufted carpets is announced by Bradford Dyers' Association Ltd. The inventor, Mr. T. L. Leckie, a director of the company in charge of their printing plant at Prestwich, Lancashire, began his experiment four years ago. Now, tufted carpets can be printed successfully in almost any traditional or contemporary design using up to eight colours. Colour penetration is stated to be complete and colour fastness exceptionally good. At present the printing width is 54 in. but this is likely to be increased in the future. Fitting and matching of designs is made possible by extreme accuracy of the width control. The capacity of the B.D.A.'s carpet printing plant is between two and three million square yards per annum.

Mr. T. L. Leckie

* * *

Machinery and Accessories

Mr. Eric Kite, a former director of the Scragg Group, has formed his own company, operating as E.G.K. Textile Machinery and Accessories Ltd., 24 Ivy Road, Macclesfield. Notable amongst the overseas agencies held by Mr. Kite, will be Plutte Koecke, Meccanotessile and Officine Meccaniche Menegatto. British agencies will include certain products of the Scragg Group, Sunderlands of Oldham and Textile Automatics of Leicester.

* * *

Water-soluble Antistatic Lubricant

Cirrasol HA (Dyestuffs Division, I.C.I. Ltd.) is an excellent carding and spinning lubricant for rayon, polyamide, polyester and acrylic fibres, and has an anti-static effect on all textile fibres. The principal application is expected to be as a lubricant in spinning staple rayon, polyamide, polyester and acrylic fibres, particularly when processing these on the cotton, flax and worsted (dry-combed) systems. When processing stock-dyed staple, Cirrasol HA is conveniently added at final rinsing after dyeing, allowing it to exhaust on the fibre in the presence of a little ammonia. In other cases, Cirrasol HA may be sprayed as a 10 - 20% solution on the fibre at opening or carding. For rayon staple, 0·2 - 0·5% is applied when using the exhaustion technique, and 0·1% in the case of spray application. For acrylic, polyamide and polyester staple fibres 1 - 2% is applied by exhaustion or 0·75 - 1·5% by spraying.

Cirrasol HA may also be used as a lubricant for filament yarns, using 0·1 - 0·3% based on fibre weight. Excellent soft finishes are given on both cotton and rayons and on synthetic fibre yarns and fabrics, the agent being applied respectively by exhaustion and padding, 0·5 - 2% on the fibre weight being used. Tests with a wide range of direct, acid and disperse dyes have shown that Cirrasol HA has insignificant effect on the shade and light fastness of these dyes.

* * *

Nyasaland Cotton

Although there has been a marked drop in world cotton prices the Nyasaland Agricultural Production and Marketing Board, a semi-Government organisation, will continue to maintain producer prices at the level of the last three years says a Barclays Bank D.C.O. message from Blantyre. In 1960 growers will receive 6d. per lb. for No. 1 seed cotton and 2d. a lb. for No. 2 seed cotton. Any losses on selling on the world cotton market will be met from the Board's price stabilisation fund which at present stands at £430,000 for cotton. The Board is expected to lose about £30,000 on this year's crop.

* * *

New Appointment

The International Federation of Cotton and Allied Textile Industries has appointed Mr. P. Warburton as statistical officer at headquarters in Manchester. Mr. Warburton has wide experience in banking and trade association work, and has travelled widely both in Europe and overseas.

* * *

At the Annual Convocation of the Textile Institute, held recently at the Lesser Free Trade Hall, the Warner Memorial Medal was presented for the first time to a woman—Dr. D. M. Hannah, M.A., M.Sc., pictured here showing the award to her husband

Fuel Problem

Speaking on behalf of the Mechanical Handling Engineering Association at an open forum in the Combustion Engineering Association's recent conference at Scarborough, Mr. F. S. Stent (Babcock and Wilcox) urged the formation of a joint panel representing both combustion engineers, mechanical handling engineers and big industrial users, which could study all problems of the mechanical handling and control of fuel within industry. Mr. P. Chambers (chairman-elect, of I.C.I) welcoming the suggestion, said that "in the past efficient fuel operation had largely been a matter of efficient combustion, but with the coming of automation to that end of the factory, it had become increasingly a problem of mechanical handling and control." He hoped the suggestion would be put forward officially to the associations concerned.

Representatives of Britain's automation and instrument industries claim it is now possible for coal-fired boilers to run themselves without attention for days on end. "If a human stoker can handle it, the instrument could do it just as well," said Mr. I. W. Stevenson (Kelvin and Hughes Ltd.). There are no statutory laws or regulations which require a human being to be in attendance on boilers, it was stated, though some insurance companies insist on special duplicated shutting-down devices, if the boiler is going to be left alone for long periods. Efficient automatic control can, it is claimed, save 10% of the factory's fuel bill—and because of the greater consistency of temperature and working conditions, can often save substantial sums in the operating process in the factory itself.

* * *

Knitting Wool Consumption

It is now estimated that one in every thirty homes has a knitting machine. During the Jan. - June period of 1959 knitting wool consumption in the U.K. totalled 16·72 million lbs. as compared with 12·90 million lbs. in the same period of 1958. This total, of course, refers to purchases by the very great number of hand knitters as well as by those possessing machines.

* * *

Chatting together after receiving Service Medals at the Annual Convocation of the Textile Institute are (left), Dr. A. R. Urquhart, F.R.I.C., F.T.I. (Assistant Director, British Cotton Industry Research Association), and (right) Mr. Walter Garner, M.Sc., F.R.I.C., F.T.I. (Chairman, London section of the Institute)

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British Textile Display in South Africa

British textiles will be the theme of the display in the U.K. Pavilion at next year's Rand Show in Johannesburg, April 4 - 23. There will be an official exhibit with a composite display of fabrics on the ground floor while a number of individual firms will have stands on the mezzanine. The U.K. Pavilion, a permanent one first used for the 1959 show, provides about 7,000 sq. ft. of exhibition space. The official exhibit is being organised by the B.o.T. with the co-operation of the Textile Promotion Consultative Committee, London, and it is being designed by the Central Office of Information. The display will incorporate fabrics supplied by the British Man-Made Fibres Federation, Cotton Board, Domestic Textiles Federation of Lace and Embroidery Employers' Associations, Furnishing Fabrics Federation, Irish Linen Guild, National Wool Textile Export Corporation and the Silk and Rayon Users' Association.

• • •

Finishing Group Conference

The Finishing Group of the Textile Institute held its first conference on December 9 at the Lesser Free Trade Hall, Manchester. The programme included papers and discussions on the following topics:—

Hot-air drying: *Effect of Temperature and Humidity*. P. Wadsworth (British Cotton Industry Research Association).

Stenter Drying. K. S. Laurie (J. Dalglish and Sons Ltd.).

Superheated Steam Drying. F. L. Warburton (Wool Industries Research Association).

Infra-red Heating. G. H. Moule (A.E.I. Export Ltd.).

Fluidised Beds. Dr. A. S. Roberts (British Rayon Research Association).

Migration of Solutes During Drying. D. Wilson (Courtaulds Ltd., Bocking).

• • •

Managers of the Future

The Management Consultants Association continues its useful series of "blue books" with "Tomorrow's Managers"—a reminder of the need to train and prepare leaders now. This publication emphasises the need for existing management to take the initiative, for theoretical instruction, for the "outside" activities of younger recruits, and for a planned pattern of training for future managers. It also shows how M.C.A. can help clients in all these matters. The booklet can be obtained free from M.C.A., 4 London Wall Buildings, E.C.2.

• • •

Technical Information

The following publications are available from I.C.I. Ltd., Dyestuffs Division, Blackley, Manchester:—

No. 504. Lissapol GLN in the "Poensgen Contra-Flow Carousel" Washing Machine.

No. 512. Chrome Dyes: Application to Wool Yarn by the Afterchrome Process.

No. 515. Printing "Terylene"/Cellulosic Fibre Unions.

No. 516. Chrome Dyes: Application to Wool Piece-Goods by the Afterchrome Process.

No. 521. Acid and Chrome Dyes: Infra-Red Reflectance when Applied to Wool.

Softening and Antistatic Agent

Irgavel DC, a new softening and antistatic agent, announced by Geigy Co. Ltd., Rhodes, Middleton, Manchester, broadens the range of finishes available to the drycleaner. It gives a soft cashmere-like handle to knitted garments made from "Orlon," "Acrilan," "Courtelle," nylon, etc., as well as imparting anti-static properties which are important on these fibres. Irgavel DC may be used in conjunction with Irgaset SRT, Geigy's recently introduced substantive re-texturing agent, to give a firm finish with a soft surface handle.

• • •

Topmakers to Move to Dewsbury

Because of expanding business John Reddihough Ltd., one of the oldest and largest firms of Bradford topmakers, is to move to Spinkwell Mills, Dewsbury. Their topmaking and woolcombing activities, now carried out at Caledonia Mills, Bradford, will be transferred there in the near future. Vendors of Spinkwell Mills are Mark Oldroyd Ltd., woollen manufacturers, who ceased production there some months ago.

• • •

Crosses and Heatons Scrapping Programme

The directors of Crosses and Heatons Ltd. report that the number of spindles for scrapping or otherwise for disposal under the cotton industry reorganisation scheme is approximately 626,000 mule equivalent spindles together with a small number of doubling spindles. This will leave 508,000 mule equivalent spindles and 32,000 doubling spindles. The mills due for closure have now ceased spinning production with one small exception.

Personal

Ateliers Houget, Verviers, Belgium, have appointed Mr. O. Glaessner, A.T.I., Haddon, Taunton Road, Ashton-under-Lyne, sales agent in Great Britain for their Type RTF woollen ringframe.

• • •

Aber Works

Courtaulds Ltd. have decided to reopen part of Aber Works, Flint, for the manufacture of bleached sulphate pulp for the paper and board industries. These works, it will be remembered, closed in December, 1957 as a first step in Courtaulds' policy of concentrating production of rayon yarn in more economic units. Plans are now in hand for the installation of machinery and plant. Initial output will be of the order of 50,000 tons per year. Production is scheduled to start towards the end of 1960. The plant will incorporate a high degree of automation and only a small number of operatives will be required.

• • •

"Courtelle" Fibre

Courtaulds Ltd. have decided to double capacity at their Grimsby factory for their new acrylic fibre, "Courtelle." The price of standard "Courtelle" in 3, 4½ and 6 den. will be reduced from 100d. to 96d. per lb. A special quality will be offered in coarse deniers at 78d. per lb. Present annual capacity at Grimsby is 10 mn. lb. In addition the plant at Little Heath works, Coventry, which started production in 1957, has capacity for 2 mn. lb. The extension can easily be accommodated on the 500-acre site at Grimsby and the new capacity is scheduled to come into production early in 1961.

New Companies

London Wool and Monair Co. Ltd. Private. Reg. Oct. 6. Capital £10,000 in £1 shares. Exporters, importers, and merchants of wools, worsted, alpaca, mohair, cotton, etc. Registered office: 2 Suffolk Lane, E.C.4.

Farron Dyeing Co. Ltd. Private. Reg. Oct. 6. Capital £10,000 in £1 shares. Registered office: Smedley Dye Works, Cheetham, Manchester 8.

Duphar Ltd. Private. Reg. Oct. 7. Capital £100,000 in £1 shares. Spinners and manufacturers of cotton, silk, etc. Registered office: Spencer House, South Place, E.C.2.

H. Sidgreaves Ltd. Private. Reg. Oct. 14. Capital £1,000 in £1 shares. Dealers in fents, jobs, and textiles generally, etc. Secretary: H. Sidgreaves. Registered office: 15 East Street, Manchester 2.

Tyber Pile Fabrics (Great Britain) Ltd. Private. Reg. Oct. 15. Capital £2,000 in £1 shares. Manufacturers, merchants, importers and exporters, dealers in man-made fibres. Solicitors: F. S. and R. A. Ingle, Bath.

Tintawn Ltd. Private. Reg. Oct. 19. Capital £1,000 in £1 shares. Spinners, doublers and manufacturers of rope, twine, and cord. Registered office: 658 Ajax Avenue, Slough, Bucks.

Britannia Nylons Ltd. Private. Reg. Oct. 23. Capital £2,000 in £1 shares. Manufacturers and dealers in all kinds of goods, particularly nylon, etc. Registered office: 310 - 312 Chiswick High Road, W.4.

John Glassner and Co. (Textiles) Ltd. Private. Reg. Oct. 23. Capital £5,000 in £1 shares (4,000 5% preference and 1,000 ordinary). Manufacturers and dealers in wool, worsted, etc. Registered office: Berkeley Court, Baker Street, W.1.

S. Rashman (Textiles) Ltd. Private. Reg. Oct. 23. Capital £1,000 in £1 shares. Manufacturers and dealers in cotton, etc. Registered office: 76 Victoria Street, Manchester.

W. L. Taylor and Company Ltd. Reg. Oct. 26. Capital £240,000 in £1 shares. Spinners, weavers, doublers, bleachers, dyers and printers, etc. Registered office: Victoria Mills, Horwich, Lancs.

Alfred Dearnley and Sons Ltd. Private. Reg. Oct. 28. Capital £30,000 in £1 shares. Cotton and wool waste merchants. Registered office: Cromford Street, Nottingham.

N. Stone Ltd. Private. Reg. Oct. 28. Capital £3,000 in £1 shares. Manufacturers of knitwear, etc. Registered office: 21 Devonshire Street, W.1.

E. Addleman (New Bond Street) Ltd. Private. Reg. Oct. 29. Capital £5,000 in £1 shares. Linen factors, manufacturers of linen, lace, and fabrics of all kinds, etc. Solicitors: Paisner and Co., 44 Bedford Row, W.C.1.

L. A. Brook of Dewsbury Ltd. Private. Reg. Oct. 29. Capital £20,000 in £1 shares. Manufacturers of cleaning cloths, wiping rags, cotton waste, etc. Registered office: 154 Bradford Road, Dewsbury.

Bancroft and Sunderland (Holdings) Ltd. Private. Reg. Oct. Capital £30,000 in £1 shares. (15,000 "A" and 15,000 "B.") Merchants and manufacturers of woollen waste, rayon, wool, worsted, etc. Registered office: Charles Mill, Oxenhope, near Keighley.

Genie (Printing) Ltd. Private. Reg. Oct. 30. Capital £2,000 in £1 shares. Colour printers, silk screen printers, rotagravure and letterpress printers, etc. Registered office: Bishop House Mill, Rylands Street, Burnley.

D. E. Marchington (Converters) Ltd. Private. Reg. Oct. 30. Capital £1,000 in £1 shares. Textile merchants and converters, etc. Registered office: 50 Chestergate, Macclesfield.

John Hardy and Co. (Bradford) Ltd. Private. Reg. Oct. 30. Capital £20,000 in £1 shares. Wool merchants and brokers. Registered office: 1 Aked Street, Bradford 1.

Buchholtz and Company Ltd. Private. Reg. Nov. 3. Capital £1,000 in £1 shares. Lace and curtain manufacturers, merchants, etc. Solicitors: Drougleever and Co., 14 Hans Road, S.W.3.

L. Samuels Ltd. Private. Reg. Nov. 3. Capital £20,000 in £1 shares. Manufacturers and dealers in wool and woollen goods, worsteds, yarns, tweeds, cloths, etc. Registered office: 27 Queen Anne Street, W.1.

Preshaw Products Ltd. Private. Reg. Nov. 3. Capital £1,500 in £1 shares. Manufacturers and dealers in stockinette, chamois leather, synthetic sponges, sponges, mops, twines, brushes, etc. Registered office: 27a Sun Street, Newton Heath, Manchester 10.

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DYLAN is a registered trade mark which denotes that goods carrying the mark are made of wool or mixtures containing wool, have been treated by processes approved by Stevensons (Dyers) Limited and have passed their standards of shrink-resistance. When washed in accordance with recommended procedures for wool, garments bearing the trade mark DYLAN will not felt or shrink out of fit.

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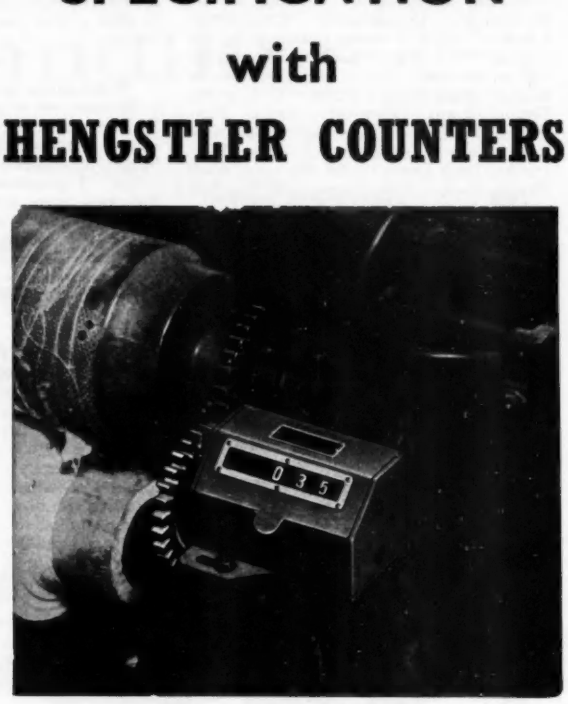

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RECENT TEXTILE PATENTS

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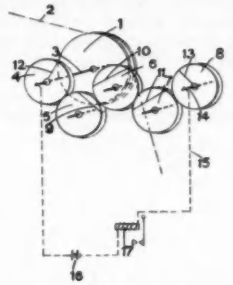
801,600 Yarn Length-Metering Mechanism

VEREINIGTE GLANZSTOFF-FABRIKEN A.G., *Wuppertal-Elberfeld, Germany.*

In a yarn length metering mechanism a metering wheel 1 can be turned by yarn2 passing over it. A shaft 3 on which the metering wheel is mounted drives a single train of gear wheels 4, 5, 6, 7 and 8. The wheels 4 and 8 each have a single contact and serve as input and output to an electrical circuit, while the wheels 5, 6 and 7 each have two contacts, which can be in the form of conducting tooth flanks and complete an electrical circuit in a very simple manner. The two contacts of the wheels 5, 6 and 7 are interconnected by conductors 9, 10 and 11. If the contacts of these wheels are diametrically opposite one another, the gear wheel train returns to its original position only after a number



of revolutions of the metering wheel corresponding to half the actual number of teeth in the train. The two contacts of the wheels 4 and 8 are connected by conductors 12 and 13 to shaft 3 and shaft 14, respectively, and are disposed in a conductor system 15 which is supplied by a current source 16. As soon as the system with the wheels 4 and 8 passes through a position in which the circuit is completed (which is normally the original position of the train), a brief electric current flows through the fixed conductor system 15 and by way of the movable conductors 9 to 13, the current arousing a response from a switching relay 17, which causes the yarn to break by means of a yarn-breaking device which is not shown.

801,972 Pneumatic Gauges

SIGMA INSTRUMENT CO. LTD., *Letchworth, Hertfordshire.*

Relates to pneumatic gauges that employ a liquid manometer for giving a visual indication of the magnitude of a pneumatic pressure that varies in accordance with a gauged dimension. The manometer has an upright transparent tube for receiving liquid, the level of the liquid in the tube giving visual indication. A diaphragm in a diaphragm box divides it into first and second chambers and limits the flow of liquid from the tube, the lower end of the tube communicating with the first chamber. The gauge includes a reservoir having an outlet communicating with the first chamber, the reservoir serving to contain liquid and having means for expelling liquid from it, through outlet.

802,169 Non-Wicking Cords

B. F. GOODRICH CO., 230 *Park Avenue, New York, U.S.A.*

A tubeless pneumatic tyre having spaced circumferentially extending beads provided with fabric finishing strips formed of elastomer covered cords, each of which is formed from a plurality of synthetic filaments twisted together, comprising cords in the finishing strips in which the interstices between the filaments are all blocked to the passage of air longitudinally there through by an elastomer deposited in the interstices from a liquid containing the elastomer in solution so that the cords cannot act as wicks for the passage of inflation air from the interior of the tyre. The elastomer deposited in the interstices between the cord filaments is rubber, and the elastomer covering of the finishing strips comprises a layer of butyl rubber on one side and a layer of different rubber on the other side with the strips positioned that the layer of different rubber is outermost to provide a chafe-resisting surface.

802,182 Driving and Tension Control on Winding Machines

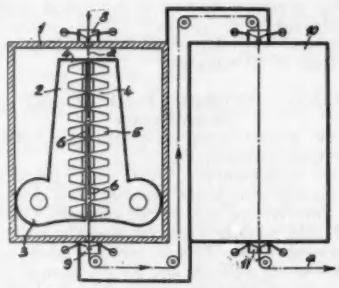
P. R. C. GRANGIE and L. E. BIANCO, 23 *Rue du Général Leclerc, Liancourt (Oise), and* 35 *Rue du Rocher, Paris (Seine), France.*

A winding machine wherein all the spindles are driven from a common drive shaft and a non-variable mechanical connection is provided between these spindles and the associated yarn guides. The spindles are driven through the medium of a common variable speed gear which is responsive to, and varied as a result of, the changes in the tensions in all the yarns, relatively to a predetermined value of this sum, whereby the speed of the spindles is reduced when the tensions exceed this value and vice versa.

802,296 Drying Machine for Fabrics, etc.

J. DUNGLER, 5 *Lange Gasse, Basle, Switzerland.*

Improved method for the continuous drying of fabric, paper, etc. The machine comprises a heat insulated enclosure 1, having the usual pressure releasing means in which are two trunks 2 through which superheated steam or the like is circulated by blowers 3, the trunks being arranged on either side of the strip *a* of fabric and having individual blowing nozzles 4 separated from each other by discharge channels 5. Radiant elements 6 are arranged in the channels 5 in a direction parallel with the strip and, preferably, at a short distance from the latter. The fabric enters the enclosure at 8 and passes out at 9 being directed, in this example to another drying



machine 10 supplied with drying fluid discharged from the machine arranged in the enclosure 1. The fabric leaves the machine 10 at 11. The radiant elements 6 and the drying fluid set in circulation by the blower 3 are brought up to operative temperature by the same source of heat, namely that serving to heat the elements.

802,344 Automatic Warp Let-Off and Cloth Take-up Motion

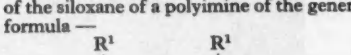
F. KONDO, 507 *Tozu, Tado-machi, Kuwana-gun, Mie-ken, Japan.*

Describes a power loom having automatic warp let-off and cloth take-up motions comprising two pawl and ratchet mechanisms disposed one at each side of the front of the loom and driven intermittently from the slay swords of the loom. One of the mechanisms is connected to a cloth driving roller to drive it intermittently, and the other is connected with one or more of a number of let-off rollers to drive them intermittently. The let-off rollers are between a beam and a back rest roller so as to provide between themselves a number of nips and such that warp threads press the let-off rollers towards one another. Means are provided whereby ratchet mechanisms may selectively be rendered inoperative or reversed.

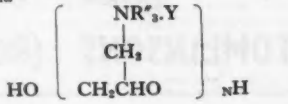
802,540 Treating Fabrics with Siloxanes

MIDLAND SILICONES LTD., 19 *Upper Brook Street, London, W.1.*

A process of depositing a siloxane on a fabric comprises immersing the fabric in a siloxane-in-water emulsion containing a non-ionic emulsifying agent and from 0·2 to 80% by weight calculated on the weight of the siloxane of a polyimine of the general formula —



in which Z is an NH_2 group or a halogen atom, R^1 is hydrogen or a methyl radical and x is an integer of at least 4, or a salt of the polimine or a compound of the general formula—



on which RII is an aliphatic hydrocarbon radical containing less than 5 carbon atoms, Y is an acid anion and *n* has a value of at least 2. The fabric is then removed from the water and dried. In one example, an emulsion was prepared which had the composition 600 ml. of water, 0·6 g. of silocane resin having the composition 63 mol % of monomethylsiloxane, 28 mol % monophenylsiloxane and 9 mol % diphenylsiloxane, 0·06 g. of an alkyl ether of polyethylene glycol as an emulsifying agent and 0·012 g. of $H_2N(CH_2CH_2NH)_4H$. 30 g. of cotton fabric was immersed in the emulsion and agitated. The resinous siloxane had completely deposited on the cotton in 60 minutes.

802,585 Automatic Feed Control on Drawframes

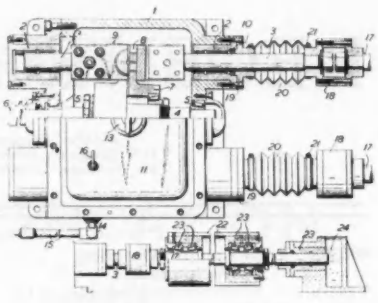
WEST POINT MANUFACTURING CO., *West Point, Georgia, U.S.A.*

A feed-control device for drawing apparatus comprises drawing rolls driven at inter-related speeds and includes a feed roll for feeding material directly to the drawing rolls. Means are provided for driving the feed roll and for measuring the amount of material passing the feed roll. The measuring means includes a number of independently movable follower means positioned to ride against the feed roll for measuring the thickness of material moving between them, pulleys mounted on the follower means being movable in response to changes of thickness of the material. A member is mounted upon the drawing apparatus adjacent the position of the pulleys on the follower, with pulleys on the member positioned between pulleys on the follower. A cable loop has first and second ends joined to move in unison and trained alternately over pulleys on the follower and pulleys on the member. Means are provided for regulating the speed of the feed roll to maintain constant the amount of material supplied from the feed roll to the drawing rolls, this means connecting the ends of the cable loop with the speed regulating means to control the same. Non-linear correcting means includes a follower surface curved to produce a hyperbolic function, the correcting means being interposed between the thickness measuring means and the speed regulating means.

802,627 Roller Felting Machines

WILLIAM BYWATER LTD., *Sweet Street Foundry, Leeds* 11, and B. O'BYRNE.

Driving mechanisms for the rollers in roller felting machines, in which it is desired to give certain of the rollers a reciprocating movement in addition to their normal continuous rotation. The driving mechanism comprises a housing 1 within which are mounted by bushes 2, two ends of slidable and non-rotatable extension shafts 3. Between the shafts is mounted a wobble shaft 4 which is carried in bearings 5 and has a projecting end 6 by means of which the shaft is driven. A wobble ring 7 is mounted on the shaft 4 and has projecting arms 8 which are secured to trunnions 9, one on each shaft 3. The housing is partly filled with oil, having oil seals 10 for the



projecting shafts, a detachable cover 11 and sealing gasket. The housing is also provided with an oil filler cap 13, oil level gauge 14, drain pipe 15 and breather pipe 16. The shafts 3 are connected to non-rotatable shafts 17 by couplings 18, and between the couplings and oil seal retainer members 19 there are flexible covers 20 retained in position by the clips 21. The rollers 22 are freely rotatable through bearings 23 on the shafts 17 whose free ends are slidably supported in bearings 23x which incorporate oil reservoirs 24. In operation the driving of the wobble shaft 4 imparts a non-rotating oscillatory motion to the wobble-ring 7 whose projecting arms 8 cause the shafts 3 and their roller shafts 17 to reciprocate without rotating in their bearings, thereby reciprocating the two rollers with an out-of-step motion.

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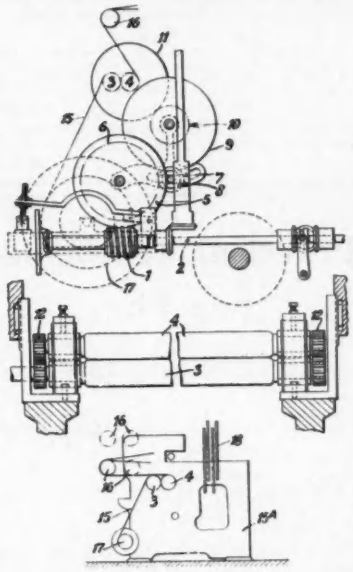
TOMLINSONS (ROCHDALE) LTD., OLDHAM ROAD, ROCHDALE

802,678 Positive Warp Let-Off Motions
WOOL INDUSTRIES RESEARCH ASSOCIATION, *Torridon, Leeds* 6.

A warp controlling mechanism on a loom, whereby a positive control of the warp is achieved together with an effective control of the shedding point. The let-off mechanism comprises a worm 1 fixed to the reversing shaft 2 and transmitting motion to the delivery rollers 3, 4 through gearing consisting of worm wheel 5, pinion 6, change wheel 7, change wheel 8, intermediate wheel 9, intermediate pinion 10 and roller end wheel 11. The rollers 3, 4 are positively driven through spur wheels 12 at both ends, and they intergear throughout their full lengths by reason of



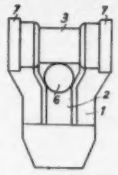
their fluting. Each roller 3, 4 has an oil-resistant covering which affords a resilient grip upon the threads 15. The rollers 3, 4 are mounted inside the loom frame 15A and are positioned in front of a third roller 16. This roller controls the shedding point of the warp and the length of the warp over which shedding may be required. The warp from the beam 17 passes around the nip roller 3 and thence between them and around the roller 4 to the roller 16 which is freely rotatable, and from this roller the warp passes through the shed and healds 18 to the cloth take-up roller. The warp will be lifted-in in the usual way with the exception that the roller 16 is raised to an uppermost position to enable the inside roller to be removed. The warp in the heald shafts 18 is then lifted over roller 16 and the heald shafts suspended in position in the loom. The inside nip roller is replaced in position carrying the warp with it thus obtaining the desired "S" arrangement of the warp in the let-off rollers. The back roller is then lowered into its required position and the warp is tied in the customary manner.

802,932 Loom Picker
PICKERFABRIK WESTFALIA G.M.B.H., *Vreden, Westfalen, Germany.*

The object is to utilise for loom pickers, instead of rawhide or leather, a suitable synthetic material possessing the advantages of these materials. The efficiency of the rawhide or leather picker can not only be equalled, but can be exceeded several times, by pickers consisting of high-molecular polythene of molecular weight 500,000 and preferably 1,000,000, and prepared by a low pressure process.

803,063 Jute Loom Picker
ALBERT HAAG, 9 *Talstrasse, Weil der Stadt, Germany.*

An improved picker, for a jute loom, in which 1 is the striking part, 2 is a recess in the middle part, 3 is the spindle guide, 6 the opening for the picking strap and 7



are the two reinforced edges on the spindle guide. These flanges are of the same material as the picker, and integral with it, and they resist any deformation of the guides due to the tendency for the picker to rotate in its own plane.

803,110 Heat Treatment of Polyamide, etc. Fibres
PERMATWIST CO., *P.O. Box* 483, *South Coatesville, Pennsylvania, U.S.A.*

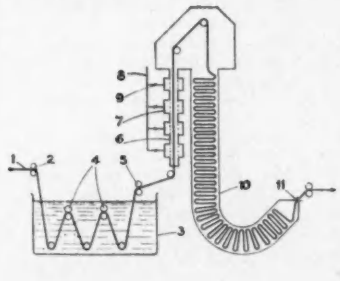
An electric heating device, for use in processing thermoplastic yarn, comprises a tube of small bore defining an elongated restricted heating zone through which the yarn may continually be passed. A coil of resistance wire surrounds the tube throughout its length, the pitch of the coil turns increasing progressively toward the midpoint of the tube and thereafter decreasing progressively toward the other end of the tube. Means are provided for maintaining the temperature within the tube constant when heated by the resistance wire.

803,116 Waste Removal on Cards
MANUFAKTUR AKTIE BOLAGET I MALMO, 13 *Trelleborgsvagen, Malmo, Sweden.*

A cleaning apparatus for carding machines which is portable to permit its use for a number of carding machines. A cylinder, which has its periphery equipped with teeth, is mounted for rotation in a housing with a slot uncovering an arc portion of the cylinder and extending along the whole length, and a compressed-air turbine mounted in the housing is connected to the cylinder.

803,304. Continuous Bleaching of Yarns or Fabrics
DEUTSCHE GOLD-UND SILBER-SCHEIDEANSTALT VORMALS ROESSLER, 9 *Weissfrauenstrasse, Frankfurt (Main)* 1, *Germany.*

Apparatus for continuous bleaching of yarns, woven or knitted fabrics, etc. The material 1 passes over rolls 2 into a bleaching vessel 3 and is thoroughly worked by pairs of rolls 4 below the surface of the bleaching liquor. The excess liquor is squeezed from the material by a pair of rollers 5, and the material then travels up a vertical shaft 6 on which are arranged, four heating devices 7 from which steam, fed by pipe 8, is directed on to the material. The supply of steam to each heating device can be adjusted by regulating devices 9. The material passes from the shaft into a J-shaped heat insulated reaction vessel 10 from which its is withdrawn at an outlet 11.



803,590 Twisting and Winding Control on Spinning Machines
G. E. M. SAGEHOMME, 82 *avenue de Spa, Heusy-Verviers, Belgium.*

The purpose is to enable control of working of a spinning frame as well as to select the starting values for the various speeds. The frame comprises a panel and two pointers movable along directions at right angles to one another whereby their positions are representative of the speeds respectively of the winding-on means and of winding on. The panel is marked with lines, the gradient of each of which represents a particular twist so that the intersection of the pointers indicates on the lines the particular twist obtained at the setting of the frame represented by the position of the pointers.

803,646 Yarn Transfer on Automatic Weft Winders
MASCHINENFABRIK SCHWEITER A.G., *Horgen, Switzerland.*

An automatic weft pirn winding machine has a rotatable catch to transfer the yarn winding from a finished pirn to an empty one. The catch hook is mounted for rotation about, and axial movement along the axis of the driving spindle of the machine. The hook can be moved axially in one direction, and rotated to catch the yarn and loop it about an empty pirn, and then in the other direction, to disengage the hook from the yarn.

804,120 Screen Printing Woven or Knitted Fabrics
COURTAULDS LTD., 16 *St. Martin's-le-Grand, London.*

A process for printing fabrics comprises applying a printing paste containing a dyestuff, a thickener and urea, or a mixture or urea with one or more substances soluble in molten urea are dried and capable of lowering the melting point of the urea. The printed materials are dried and baked at a temperature between the melting point of urea and 160°C., or between the melting point of the mixture and 160°C., washed to remove the urea and dried. In one example, a cutting of fabric made from knitted cellulose triacetate fibre was printed by means of a mesh screen with a paste made up as follows:—

2 parts of Dispersol Yellow G300 (I.C.I.).
46 parts of "Nafka."
50 parts of urea in 100 parts of water.

The fabric was then dried and the pattern divided into two parts. One part was baked for 4 minutes at 140°C. to melt the urea, and effect distribution and transfer of dyestuff, and the remaining part was retained in the unwashed condition. Both the baked and unbaked cuttings were then washed in solution containing 0·2 part per 1,000 of soap for 30 mins. at 40°C., and then dried. It was found that the washing treatment resulted in gross loss of colour from the unbaked pattern whereas the baked pattern showed excellent retention of both pattern and colour.

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RING Doubling Machine, Silk Type, with between 50 to 100 spindles. Package capable of taking 1 lb. of yarn preferred. Box No. TO36, "Textile Manufacturer," 31 King Street West, Manchester 3.

ADVERTISER wishes to purchase four Hattersley Narrow Fast Looms for pattern weaving. Must be in good condition. Offer to Box No. T.M. 28, "Textile Manufacturer," 31 King Street West, Manchester 3.

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SIX medium Pitch Double Shed five-frame 27-in. width Wilton Loom Jacquards made by Hardaker Ltd. in 1951. Complete with accessories and stamping plates and punches. Apply in writing to Victoria Carpet Co. Ltd., Kidderminster.

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Machinery, Plant, Accessories For Sale

TWO Crabtree Gripper Axminster Sofa Looms. 48 ins. reedspace. Equipped with Hardaker eight-frame Jacquards and Horizontal Creels. The Victoria Carpet Co. Ltd., Kidderminster.

MANUFACTURERS of sectional water storage tanks, 50 to 40,000 gallons capacity. Sewage and Effluent Pumps. G. L. Murphy Limited, Imperial Works, Menston, Nr. Leeds.

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MANUFACTURERS of up-to-date Cotton Textile Machinery not already represented in China and wishing to have their products considered by this market are requested to submit offers with literature in quadruplicate to Box TO38, "Textile Manufacturer," 31 King Street West, Manchester 3.

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LOOM DESIGNER required for Company in West Scotland Area, must have wide experience in design of Wilton and/or Axminster Carpet Looms. Applicants should be technically qualified and fully competent in theory and practice, to develop the above machines on modern design principles, and discuss problems and proposals with the management of the weaving mills.

A good salary will be paid to the successful candidate. Applications to contain full details of qualifications and experience, and past employers with positions held in each case. Reply to Box No. TO37, "Textile Manufacturer," 31 King Street West, Manchester 3.

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SENIOR Executive required for the Sales Office of Samuel Pegg and Sons Ltd. Successful applicant should have an engineering background with a comprehensive knowledge of the textile dyeing and finishing industry. Replies will be treated in the strictest confidence and should be addressed to the Managing Director, Samuel Pegg & Son Ltd., Barkby Road, Leicester.

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SECOND Hand Horizontal Steeping Press in good working order, for Cellulose sheets 800 x 600 m/ms, capacity 200 or 300 kilos, self unloading, complete with pump and ancillaries. Full details to

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18 Saurer auto. multi-battery looms, 4×1, model 100W, 62 ins. (2 new in cases; 8 with Dracup and 6 with Rutherford DCDL fine pitch jacquards); 6 Saurer 7-colour 4×4 drop box pick-and-pick jacquard looms, 100W, 62 ins. fine pitch (almost new); 6 Saurer auto. looms, 4×1, 66 ins., 16-shaft dobbies (almost new); 12 Saurer single shuttle fully auto. looms, 66 ins., 16-shaft dobbies, leno shaker and slackener motions, 3D2 warp let-off (all motors standard 3-phase). Schweiter auto. pirn winder type MSK4, 24 sp.; Schweiter super-auto pirn winder MSL6, 24 sp.; Britoba, Hacoba, Harrison and Leesona pirn winders; Titan warp tying machines; card punching machines; German selvedge trimmer; Stutz pirn stripper and Jackson skip lifter; dry slasher; Comet cloth examining machine; creasing and sword lapping machine; Vulcascot beam lifter; hydraulic beam jack; beams; pirns; selvedge bobbin winder; electric reaching-in machines; shuttle truer; yarn testing equipment; Singer overlock and other sewing machines; warehouse equipment; weighing machines; transporter trucks; industrial vacuum cleaners; pillar drill; electric grinders and general mill equipment.

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